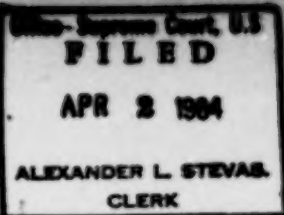


**83 - 1621**



No. \_\_\_\_\_

IN THE  
**Supreme Court of the United States**

— • —  
October Term, 1983  
— • —

**DETROIT PLASTIC MOLDING COMPANY,**  
**Petitioner,**  
**vs**  
**USM CORPORATION,**  
**Respondent.**

— • —  
**PETITION FOR A WRIT OF CERTIORARI**  
**TO THE UNITED STATES COURT OF APPEALS**  
**FOR THE SIXTH CIRCUIT**  
— • —

**BROOKS & KUSHMAN**  
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## QUESTIONS PRESENTED

### I. PRETRIAL ORDER INTERPRETATION

WHETHER DISPOSITIVE DOCUMENTARY EVIDENCE, COMPRISING A LETTER AND ENCLOSED PATENT SPECIFICATION, WAS PROPERLY EXCLUDED AT TRIAL ON THE BASIS THAT THE LETTER AND ENCLOSED PATENT SPECIFICATION HAD NOT BEEN LISTED AS AN EXHIBIT IN A PRETRIAL ORDER ENTERED UNDER RULE 16 OF THE FEDERAL RULES OF CIVIL PROCEDURE, NOTWITHSTANDING THAT THE LETTER AND ENCLOSED PATENT SPECIFICATION WERE THE OBJECTING PARTY'S OWN DOCUMENTS AND NOTWITHSTANDING THAT THE LETTER ITSELF — WHICH SPECIFICALLY REFERRED TO THE ENCLOSED PATENT SPECIFICATION — HAD BEEN LISTED AS AN EXHIBIT IN THE PRETRIAL ORDER AND ADMITTED.

### II. PRETRIAL ORDER MODIFICATIONS

WHETHER RULE 16 OF THE FEDERAL RULES OF CIVIL PROCEDURE REQUIRED MODIFICATION BY THE DISTRICT COURT OF THE EXHIBIT LIST IN A PRETRIAL ORDER ENTERED UNDER RULE 16 TO SPECIFICALLY RECITE DISPOSITIVE DOCUMENTARY EVIDENCE, COMPRISING A LETTER AND ENCLOSED PATENT SPECIFICATION, AFTER THE DISTRICT COURT REJECTED THE EVIDENCE ON THE GROUNDS THAT THE EVIDENCE WAS NOT ON THE EXHIBIT LIST, IF THE REQUESTED MODIFICATION WAS NECESSARY TO MEET THE REQUIREMENT OF RULE 16 "TO PREVENT MANIFEST INJUSTICE" UNDER CIRCUMSTANCES WHERE THE COVER LETTER AND ENCLOSED PATENT SPECIFICATION WERE THE RESISTING PARTY'S OWN DOCUMENTS AND WHERE THE LETTER ITSELF — WHICH SPECIFICALLY REFERRED TO THE ENCLOSED PATENT SPECIFICATION — HAD BEEN LISTED AS AN EXHIBIT IN THE PRETRIAL ORDER AND ADMITTED.

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**PETITION FOR A WRIT OF CERTIORARI  
TO THE UNITED STATES COURT OF APPEALS  
FOR THE SIXTH CIRCUIT**  
—•—

Petitioner Detroit Plastic Molding Company respectfully prays that a Writ of Certiorari issue to review the Judgment and Opinion of the United States Court of Appeals for the Sixth Circuit entered in this proceeding on September 22, 1983.

## **OPINIONS BELOW**

The Opinion of the Court of Appeals, withheld from publication under Sixth Circuit Rule 24, is in the Appendix hereto. The Opinion rendered by the District Court for the Eastern District of Michigan, published at 536 F. Supp. 902, is also in the Appendix hereto.

## **JURISDICTION**

The Judgment of the Court of Appeals for the Sixth Circuit was entered on September 22, 1983. A timely petition for rehearing was denied on January 6, 1984, and this Petition for Certiorari was filed within 90 days of that date. The Sixth Circuit order denying rehearing is in the Appendix hereto. This Court's jurisdiction is invoked under 28 U.S.C. § 1254(1).

## **RULE 16 OF THE FEDERAL RULES OF CIVIL PROCEDURE**

Rule 16 of the Federal Rules of Civil Procedure provides:

### **Rule 16. Pre-Trial Procedure; Formulating Issues**

In any action, the court may in its discretion direct the attorneys for the parties to appear before it for a conference to consider

- (1) The simplification of the issues;
- (2) The necessity or desirability of amendments to the pleadings;
- (3) The possibility of obtaining admissions of fact and of documents which will avoid unnecessary proof;

(4) The limitation of the number of expert witnesses;

(5) The advisability of a preliminary reference of issues to a master for findings to be used as evidence when the trial is to be by jury;

(6) Such other matters as may aid in the disposition of the action.

The court shall make an order which recites the action taken at the conference, the amendments allowed to the pleadings, and the agreements made by the parties to any of the matters considered, and which limits the issues for trial to those not disposed of by admissions or agreements of counsel; and such order when entered controls the subsequent course of the action, *unless modified at the trial to prevent manifest injustice*. The court in its discretion may establish by rule a pre-trial calendar on which actions may be placed for consideration as above provided and may either confine the calendar to jury actions or to non-jury actions or extend it to all actions.

(Emphasis added.)

### STATEMENT OF THE CASE

In this action, USM Corporation ("USM") sued Detroit Plastic Molding Company ("DPM") for infringement of U.S. Patent No. 3,776,989 and U.S. Patent No. 3,801,686 (" '989 and '686 Patents").

DPM raised a defense of invalidity under 35 U.S.C. § 102, relying on the following admission in a letter to

the Patent and Trademark Office by USM's patent attorney, Peter Tavernini:

Messrs. Kyritsis and Simmonds subsequently developed a novel method which is disclosed in the enclosed specification. *Unfortunately, a U.S. application cannot be filed on said method since it was publicly disclosed more than a year ago.* Japanese patent regulations still permit the obtaining of valid protection in Japan and commercial prospects make patent protection desirable there. Hence, permission to effect filing in Japan is hereby requested.  
(Emphasis added.)

A copy of the Tavernini letter — but not the enclosed specification — had been produced by USM during discovery, and that letter was listed by DPM as Exhibit 7 on DPM's exhibit list in the pretrial order entered by the District Court under Rule 16 of the Federal Rules of Civil Procedure. DPM subpoenaed the letter with the enclosed specification on the opening day of trial, but the District Court would not compel production at that time. DPM subpoenaed the letter and enclosed specification again during trial, but the District Court quashed the second subpoena on USM's motion. DPM offered the letter as DX G (Defendant's exhibits were identified at trial by letters rather than numbers), and it was admitted into evidence.

Thereafter DPM obtained a certified copy of the letter *with* enclosed specification from the Patent and Trademark Office, marked the certified copy as DX G-1, and offered it. USM objected that the certified copy had not been listed on the pretrial order — although the letter itself had been listed and admitted, the enclosed

specification had not been separately recited as a subpart of the exhibit in the pretrial order. DPM first offered DX G-1 and then moved to amend the pretrial order to gain admission of DX G-1, but the District Court denied both requests and excluded DX G-1. Prior to that exclusion, the District Court had admitted documentary exhibits offered by both parties which had not been listed as exhibits in the pretrial order.

Toward the end of trial, DPM filed a written motion again seeking admission of DX G-1, or, alternatively, amendment of the pretrial order to include DX G-1, and then its admission. USM opposed that motion, and the District Court denied it. Following that exclusion, DPM made an offer of proof regarding the excluded evidence.

The District Court addressed the admission in the letter (DX G) at pages 22-25 of its Opinion. At the threshold, on page 23, the District Court said: "The only evidence that was *submitted* by DPM on this issue [the admission of § 102 invalidity] is a letter, dated December 29, 1970, which had been sent by USM's patent counsel, Peter Tavernini (Tavernini) to the Patent Office." (Emphasis added.) The District Court then quoted an amendment filed in the Patent and Trademark Office by Benjamin Pollard, another USM patent attorney, in obtaining the '686 Patent. USM had relied on that amendment and oral testimony to negate the admission of the Tavernini letter.

At page 24 of its Opinion, the District Court concluded:

The Court finds that the language of both of these documents [the Tavernini letter relied upon by DPM and the Pollard amendment] is so

ambiguous that it is unable to draw any conclusion from them upon this issue. The Tavernini letter neither discloses the claims sought to be filed in Japan nor the method that has been publicly disclosed. Rather, it makes reference to a "novel method which is disclosed in the enclosed specifications." *But those "enclosed specifications" were never made a part of this record.* The letter, by itself, simply does not provide sufficient information with which to enable this Court to make a finding concerning the process that was "publicly disclosed more than a year ago."

(Emphasis added.)

The District Court's Opinion is silent on the repeated attempts by DPM to bring the "enclosed specifications" into the record.

After receiving the District Court's Opinion holding that DPM had failed to meet its burden on USM's admission because the " 'enclosed specifications' were never made a part of this record", DPM moved to reopen and admit DX G-1 including both the cover letter and the "enclosed specifications". If the District Court had considered the disclosure of the enclosed specification, both patents would have been invalidated as a result of the admission in the letter in view of the disclosure in that specification. USM opposed DPM's motion, and it was denied.

The Judgment of the District Court was affirmed by the Court of Appeals for the Sixth Circuit. On page 3 of its Opinion, the Court of Appeals dealt with the exclusion of DX G-1 — Issue No. 1 on DPM's appeal — as follows:



Procedurally the appellant contends that the Court erred in excluding the "enclosed specification" referred to in the Tavernini letter. However, we find no error in this action. The appellant had a two year period in which to offer this "enclosed specification" during pre-trial proceedings. However, it failed to do so. The delay in offering this specification was never totally explained to the Court.

The Sixth Circuit had nothing further to say about the exclusion of DX G-1.

### REASON FOR GRANTING THE WRIT

The rise of pretrial order practice under Rule 16 justifies guidance by this Court on the standards applicable to interpretation of, and modifications to, pretrial orders. In the instant case, under the liberal policies of the Federal Rules of Civil Procedure, the District Court should have interpreted the listing of the letter (DX G) to encompass both the letter and the enclosed specification referred to in the letter (DX G-1). Alternatively, at a minimum, the District Court should have allowed modification of the pretrial order to recite the letter and enclosed specification as DX G-1 "to prevent manifest injustice" — the controlling standard laid down in Rule 16 itself.

In its failure to either admit or allow modification, the District Court abused its discretion under Rule 16. In affirming the exclusion of dispositive documentary evidence, the Sixth Circuit proceeded contrary to Rule 16 procedures required in other circuits and sanctioned plain error. The result was a trial advantage to USM and Judgment for USM anchored to pretrial gamesmanship — in spite of the merits.



## I.

**RULE 16 REQUIRED ADMISSION OF DX G-1**

In a word, the decisions below vest unbridled discretion in the trial judge to exclude multi-part dispositive documentary evidence unless the offering party separately recites all subparts in the pretrial order.

**A. DPM Was Repeatedly Rebuffed In Its Attempts To Complete The Record**

Notwithstanding DPM's dogged determination to have a full hearing at the trial level, USM kept the fatal documentary evidence — DX G-1, the letter *with* enclosed patent specification — from the record:

(a) *Subpoena*. DPM twice subpoenaed the letter with enclosed patent specification from USM during trial by trial subpoenas. On USM's initiative the District Court refused to compel production under the first subpoena at the start of trial, and the District Court quashed the second subpoena on USM's motion.

(b) *Certified Copy*. DPM obtained a certified copy of the letter with enclosed patent specification from the Patent and Trademark Office during trial, marked it, offered it, and moved to amend the pretrial order to recite it. USM objected to that certified copy on the basis that it had not been listed as an exhibit in the pretrial order — notwithstanding that the District Court had theretofore admitted exhibits offered by both sides that had not been listed in the pretrial order, and notwithstanding that the letter itself which referred to the enclosed specification had been listed and admitted. The District Court sustained USM's objection, refusing to admit DX G-1, and refusing to amend the pretrial order to include DX G-1.

(c) *Written Motion During DPM's Case.* Toward the end of trial during DPM's case, DPM moved for admission of the certified copy previously offered as DX G-1, or, alternatively, for modification of the pretrial order to add the letter with enclosed patent specification (DX G-1) as an exhibit, and then admission of DX G-1. USM opposed that motion, and the District Court denied it. Following that exclusion DPM made an offer of proof.

(d) *Opinion Prominence.* In its Opinion, the District Court held that DPM failed to prove invalidity *because* the patent specification enclosed with the Tavernini letter was not a part of the record. The District Court did not address DPM's repeated attempts to bring that enclosed specification into the record.

(e) *Post Trial Motion.* After receiving the District Court's Opinion, DPM moved to reopen the record and bring the letter with enclosed patent specification into the record to cure the District Court's stated deficiency in DPM's invalidity defense under § 102. USM opposed that motion, and the District Court denied it.

(f) *Appeal.* DPM raised this chronology on appeal, to no avail. Rather than address the District Court's exclusion of this dispositive documentary evidence at USM's behest, the Sixth Circuit chided DPM — saying that DPM had failed to *offer* the enclosed specification *during pretrial proceedings*. The Sixth Circuit *never* directly addressed the exclusion issue raised by DPM as Issue No. 1 on appeal, nor did the Sixth

Circuit offer any suggestion as to whom DPM should have offered the "enclosed specification" to before trial.

**B. Admission Of DX G-1 Was Required Under Rule 16 — With Or Without Modification Of The Pretrial Order**

The starting point for analysis of the District Court's exclusion of DX G-1 is the proposition that the asserted patents would have been held invalid *if* the excluded evidence had been admitted, *i.e.*, that the excluded evidence was dispositive of the case. Inasmuch as the Tavernini letter was listed, and the "enclosed specification" was specifically referred to in the Tavernini letter, listing of the letter in the pretrial order supported admission of *both* the letter and the enclosed specification.

In any event — there being no surprise or prejudice to USM as the author of the documents — admission was required "to prevent manifest injustice", the standard of Rule 16 for modification of the pretrial order. Admittedly Rule 16 leaves the question of modification of the pretrial order to the District Court's discretion, but not the unbridled discretion of the instant case.

Commentators have long noted the need for pretrial order flexibility: "Rigid enforcement of the pretrial order therefore might foreclose unforeseen valid claims and defenses as seriously as the strict pleading rules of a few generations ago." Note, *Variance From the Pretrial Order*, 60 YALE L.J. 175, 176 (1951).

And the courts have repeatedly emphasized the need for flexibility:

*Second Circuit:*

... it is a fundamental principle of pre-trial that this procedure be flexible . . . . Otherwise a pre-trial order . . . would hold the parties in a vise, and the result might be just about as bad as a return to the old sporting theory of justice.

*Clark v. Pennsylvania Railroad Co.*, 328 F.2d 591, 594 (2d Cir. 1964).

*Eighth Circuit:*

We observe that it is in the interest of efficient administration of multidistrict litigation that the trial judge follow the pretrial order *whenever possible*. However, if in any trial certain evidence precluded by pre-trial order becomes relevant by reason of development of proof at trial, it could be reversible error to blindly adhere to the prior order.

*Control Data Corp. v. IBM*, 421 F.2d 323, 327 (8th Cir. 1970). (Emphasis in original.)

The Fifth Circuit has held that the District Court has an *obligation* to modify a pretrial order, and that it is reversible error to refuse to modify a pretrial order, to prevent "manifest injustice". *Central Distributors v. M.E.T. Inc.*, 403 F.2d 943, 945-6 (5th Cir. 1968). (The court observed that the failure to amend the pretrial order to introduce records had the effect of resurrecting and revitalizing the sporting theory of justice which the Federal Rules of Civil Procedure were adopted to end.)

To reiterate, even if the District Court had been justified in interpreting DX G-1 as outside the pretrial order, which DPM submits it was not, modification of the pretrial order was required to bring that exhibit within the pretrial order.

## II.

**THE RESULT BELOW IS CONTRARY TO SETTLED PRE-TRIAL ORDER PRACTICE IN OTHER CIRCUITS**

The "manifest injustice" test of Rule 16 is not self-executing. Peckham, *The Federal Judge as a Case Manager: The New Role in Guiding a Case From Filing to Disposition*, 69 CAL. L. REV. 770, 796 (1981).

Early tests under Rule 16 focused on the element of surprise. For example, in *Clark* the court stated that the admission of testimony of witnesses who were not listed on a pretrial order was not an abuse of discretion where the plaintiff made no claim of surprise. However, as pointed out in Note, *Federal Pre-Trial Practice: A Study of Modification and Sanctions*, 51 GEO. L.J. 309, 326-7 (1963), a major drawback of the surprise test is that it is a negative rather than a positive test for "manifest injustice": Modification is permitted if such modification would not result in "manifest injustice".

A balancing approach has displaced the surprise test for pretrial order modifications. "The judge's decision whether to insist on strict compliance with the pretrial order, by precluding issues and evidence not listed in accordance with a local rule, requires him to balance the likelihood that an unmerited penalty will be imposed on an innocent party against the need to prevent unfair surprise, delay, and inefficiency." Peckham, *The Federal Judge as a Case Manager: The New Role In Guiding a Case From Filing to Disposition*, 69 CAL. L. REV. 770, 797 (1981).

Perhaps the best statement of the balancing test is set forth in *Meyers v. Pennypack Woods Home Ownership Association*, 559 F.2d 894, 904-05 (3d Cir. 1977), in which the Court laid down four factors for analysis: (1)

prejudice or surprise to the party opposing the amendment, (2) the ability of that party to cure the prejudice, (3) the extent to which the amendment would disrupt the orderly and efficient trial of the case, and (4) bad faith or willfulness in failing to comply with the court's order.

The balancing test has also been adopted in the Ninth, Tenth, and D.C. Circuits. *Smith v. Ford Motor Co.*, 626 F.2d 784, 797 (10th Cir. 1980); *Jeffries v. U.S.*, 477 F.2d 52, 55 (9th Cir. 1973); *Washington Hospital Center v. Cheeks*, 394 F.2d 964, 965 (D.C. Cir. 1968).

In the instant case, neither the District Court nor the Sixth Circuit showed any concern for the "manifest injustice" resulting from the exclusion of dispositive documentary evidence originating with USM. The balancing test for pretrial order modifications was never applied by either the District Court or the Sixth Circuit. Accordingly, this case provides an appropriate vehicle for clarification of the standards governing pretrial order modifications and endorsement of the balancing analyses devised by the other appellate courts.

### III.

**THE EXCLUSION OF DISPOSITIVE DOCUMENTARY EVIDENCE, FOLLOWED BY AN ADVERSE DECISION KEYED TO THE ABSENCE FROM THE RECORD OF THAT EVIDENCE, MARKS A DEPARTURE IN THIS CASE FROM THE ACCEPTED AND USUAL COURSE OF JUDICIAL PROCEEDINGS WARRANTING CERTIORARI**

The principal issues in this case are questions of patent infringement, questions that are now exclusively heard by the Court of Appeals for the Federal Circuit. Accordingly, the Sixth Circuit will no longer pass on



patent questions — the instant opinion has little, if any, precedential value on patent questions. The question of pretrial practice which DPM raised as Issue No. 1 on appeal, however, was a matter of general importance — justifying close scrutiny for its continuing importance and timeliness.

Rather than address that seminal issue, however, the Sixth Circuit tendered cryptic criticisms of DPM:

(a) *Pretrial Offer Of Enclosed Specification.* The Sixth Circuit opined that "the appellant had a two year period in which to offer this 'enclosed specification' during pretrial proceedings." To whom was DPM to have offered the "enclosed specification" during pretrial proceedings? What did the suggested failure to offer during pretrial proceedings have to do with the exclusion of this dispositive evidence at trial? The Sixth Circuit failed to provide any guidance on these questions raised by the quoted criticism of DPM.

(b) *Failure Of DPM Explanation.* The Sixth Circuit also sensed some unexplained delay by DPM in offering the "enclosed specification". The Sixth Circuit overlooked entirely DPM's dogged determination to bring the "enclosed specification" into the trial record. While ignoring that point, the Sixth Circuit criticized that "the delay in offering the specification was never totally explained to the court." What delay? Never totally explained to whom? DPM twice subpoenaed this dispositive evidence by trial subpoenas at the start of trial. Again, to whom was DPM to have offered the specification before the start of trial? USM had it — they had prepared



it. Trial had not started — there was no mechanism to offer it to any court, nor anyone else.

Totally absent from the District Court and Sixth Circuit Opinions is any analysis of USM's effective block to admission of the Tavernini letter with enclosed specification. Also absent from the Sixth Circuit Opinion is any analysis of the District Court's failure to admit the exhibit. As a result, DPM's invalidity defense was never heard. The failure below to address DPM's invalidity defense does not comport with minimal judicial standards.

### CONCLUSION

Pretrial order practice under Rule 16 of the Federal Rules of Civil Procedure is a matter of substantial importance to the trial bar. Review of this case would provide guidance on that practice, and permit correction of manifest injustice in the disposition below.

Accordingly, the writ of certiorari should issue to review the Judgment and Opinion of the Sixth Circuit.

Respectfully submitted,

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Dated: March 31, 1984

**APPENDICES**

**APPENDIX 1**

**MEMORANDUM OPINION**

(United States District Court — E.D. Michigan, S.D.)

(February 23, 1982)

(Supplemental Opinions April 19, 1982)

(USM Corporation, Plaintiff, v. Detroit Plastic Molding Company, Defendant — Civ. A. No. 76-72536)

Julian Abele Cook, Jr., District Judge.

**I.**

**INTRODUCTION**

**A. *The Patents-In-Suit***

On December 4, 1973, Plaintiff, USM Corporation (USM), as assignee of inventors, R. E. Annis, Jr. (Annis) and W. T. Kyritsis (Kyritsis) was granted United States Patent 3,776,989 (989 Patent). This Patent is entitled, "Method for Injection Molding Articles of Foam Material Involving Autogenous Flow." The abstract thereof provides a concise summary of its disclosure:

"A process of molding articles of foam material comprising forming a mixture of organic polymeric resin material and a blowing agent in a chamber at a temperature below the foaming temperature of the resin-blowing agent system and forcing the mixture through a restriction for resisting the flow of the material to impart heat to the material, the heat imparted being of a magnitude sufficient to raise the temperature of the mixture to the foaming temperature, and discharging the mixture, at its foaming temperature, into a mold cavity."

On April 2, 1974, USM, an assignee of inventors, Kyritsis and R. C. Simmonds, Jr. (Simmonds), was granted United States Patent 3,801,686 (686 Patent). This Patent is entitled, "Method of Injection Molding Articles of Foam Material." The abstract thereof states:

"Method of injection molding articles in which a mixture of injection molding material and a blowing agent at a temperature below the foaming temperature is brought to foaming temperature directly before the mixture enters the mold and is introduced into the mold to fill the mold cavity during the induction period of the blowing agent. The blowing agent is deactivated in portions of the mixture which contact the walls of the mold and the volume of the mold cavity is increased to allow that portion of the mixture which is not in contact with the mold walls to expand."

#### *B. The Pleadings*

On December 9, 1976, USM filed a Complaint, which alleged infringement of these two Patents by Defendant, Detroit Plastic Molding Company (DPM). In its answer, DPM denied infringement. It also filed a Counterclaim, which sought a declaratory judgment that the Patents-in-suit are invalid.

#### *C. The Trial*

This matter was tried by the Court without a jury over thirty-four days. USM called out twelve witnesses to testify and DPM called four witnesses, including two persons who had already testified for USM. The Court found the following witnesses to be most helpful in the resolution of the issues:

— Donald Chabot (Chabot) and Allen Sampson [executive employees of USM] testified concerning the history of plastic molding, as well as the research, development and marketing of the USM foam process;

— Michael Ladney (Ladney) [President and primary shareholder of DPM] testified concerning the DPM process;

— William Gore and Harry Fain [employees of General Motors Corporation], David Gonda [an employee of DPM], and Joseph Gualdoni [an agent of DPM] testified about the contract under which DPM supplies foam plastic glove box doors to General Motors;

— Dr. Byron Hunter (Hunter) [chemist and the inventor of the blowing agent used by DPM] testified concerning its behavior;

— Robert Simmonds [engineer for USM and co-inventor of the 686 Patent] was USM's technical expert concerning the Patents-in-suit, as well as the DPM process;

— James Hendry [engineer with Excello Corporation] was DPM's technical expert.<sup>1</sup>

The Court also received numerous documents and physical exhibits into evidence.<sup>2</sup>

In its deliberations after the trial, the Court had the benefit of the parties' Post-Trial Briefs, Proposed Findings of Fact and Conclusion of Law, and Reply Briefs.

This Opinion constitutes the Court's Findings of Fact and Conclusions of Law, as required by Rule 52, Federal Rules of Civil Procedure.

#### D. *The Background of the Controversy*

(1) As is apparent from the abstracts of the above-quoted Patents-in-suit, these Patents involve a foam plastic injection molding process. That process is grounded in the conventional (non-foam) plastic injection molding process. Both processes utilize an injection machine consisting of a hopper, a barrel, a screw, a shut-off valve, a nozzle and a mold. In both processes, plastic pellets are loaded into the hopper directly into one end of the barrel<sup>3</sup>, which contains a screw. This screw serves three purposes. Its mechanical action not only heats the pellets to melt them, but also moves the plastic from the hopper end of the barrel to the nozzle end. Finally, the screw operates to ram the melted plastic through the opened shut-off valve, through the nozzle and into the mold. Therein the plastic cools, solidifies, and takes the shape of the mold. After the plastic solidifies, the mold is opened, and the molded part is removed. Thereafter, the mold is closed, and the machine cycles once again by injecting another shot of melted plastic into the mold.

It has been well known for a long time in the conventional injection molding art that it is crucial to control the temperature of the plastic as it enters the mold. If the plastic is too hot, the finished parts will exhibit splay and blisters. If the plastic is too cold, the finished parts will exhibit sink marks and lack of fill. Thus, the concept of a "temperature window" in the conventional injection molding process is well known.

The methods of controlling the temperature of the plastic upon injection into the mold are also well known. There are several process parameters that can be adjusted to control that temperature, including the temperature of the barrel (which may be controlled by heating or

cooling), the residence time of the plastic in the barrel, and the injection rate.<sup>4</sup> Those who practice this art have been fully knowledgeable in the experimental procedures that are necessary with respect to these process parameters, in order to set up and operate the conventional injection process to achieve acceptable part quality.

(2) The difficulty with the conventional process arises out of the fact that as plastic cools, it contracts and sinks develop, most notably in the thicker sections of the part.

Thus, beginning about 1960, there was substantial research into the use of foam in the injection molding process. The concept is simple enough. By adding to the plastic in the barrel a chemical called a blowing agent, which decomposes into a gas when sufficiently heated, the plastic would be "foamed" after injection into the mold and the sink problem would be solved. Especially attractive to industry is the "sandwich constructed" part, the inner portion of which has a cellular structure, and the outer skin portion of which is solid. This solid outer portion allows the surface detail of the mold to be precisely reproduced. Such a part is also lighter and uses less plastic than a similar non-foamed plastic part.

(3) Several processes were developed in an effort to produce parts with such characteristics. Union Carbide developed a process in which the mold is only partially filled (called a low pressure process), so that the foaming process itself fills out the mold. However, this process resulted in little, if any, solid skin because the entire plastic was foamed. The resulting surface quality was deemed unacceptable by some.

Dow Chemical Company (Dow) promoted a process<sup>5</sup>, in which the mixture of the plastic and the blowing agent is heated to the temperature where it would be



expected to foam in the barrel. However, pressure is applied throughout the injection machine and the mold to restrain foaming until after injection. The entire mold is filled, and the expansion of the decomposing blowing agent is accommodated by expanding the mold. This process is called a high pressure process. Dow attempted to promote this process; however, in 1977, after twenty years, it abandoned the effort.

In the USM foam process, which was disclosed in the Patents-in-suit, the mixture of plastic and blowing agent is not heated in the barrel to the temperature where the blowing agent decomposes. (This temperature is called the decomposition temperature, or the foaming temperature.) Rather, sufficient heat is added during injection by means of shear friction, so that foaming commences when the mixture is in the mold. While the mixture in the mold is still fluid, the mold is expanded to allow the gas, which was generated by the decomposing blowing agent, to expand. Thus, a foamed inner portion is created. However, through the use of cooled mold walls, foaming is arrested in the portion of the mixture adjacent to the walls, so that it has a solid skin outer surface when the part cools.<sup>6</sup>

The evidence shows that the USM foam process has achieved significant commercial acceptance and success, although it has not been as successful as USM had hoped or projected.

(4) DPM manufactures and supplies molded plastic parts to industry, and uses many processes, including both the conventional plastic and the foam plastic injection molding processes. From 1972 through 1975, it obtained more substantial information from both Dow and USM concerning their respective foam processes. In 1975, DPM contracted with the Chevrolet Division of the



General Motors Corporation (General Motors) to produce and supply glove box doors of foam construction. The present controversy arises from that contract. USM contends that DPM, in fulfilling that contract, uses and infringes the processes that have been described in the Patents-in-suit. On the other hand, DPM contends that it uses the Dow process.

#### *E. The Issues*

Specifically, USM contends that DPM infringes Claims 1, 2, and 3 of the 989 Patent and Claims 1, 2, and 3 of the 686 Patent. DPM denies infringement for the reasons already stated. Thus, the Court must determine which process DPM utilized in manufacturing glove box doors for General Motors.

In addition, DPM contends that the Patents-in-suit are invalid because they were granted in violation of sections 102, 103, and 112 of Title 35, United States Code. USM denies that its Patents are invalid, and relies upon the statutory presumption of validity which is found in 35 U.S.C. § 282. DPM, in turn, challenges the applicability of this presumption.

Finally, each party contends that it is entitled to attorney fees pursuant to 35 U.S.C. § 285. USM also argues that DPM's infringement was willful under 35 U.S.C. § 284, thereby entitling it to treble damages.

Because it is material to the issues that were raised under sections 102, 103, and 282, as well as the infringement issue, the scope and content of the prior art will be reviewed initially and in some detail. Thereafter, the specific validity and infringement issues will be resolved. Finally, the Court will resolve the claims under sections 284 and 285.

II.

THE SCOPE AND CONTENT OF THE PRIOR ART

In its Post-Trial Proposed Findings of Fact and Conclusions of Law<sup>7</sup>, DPM cited the description of the prior art which was disclosed in the 989 Patent, and six specific prior art references.<sup>8</sup>

A. *The Description of the Prior Art in the 989 Patent*

The 989 Patent disclosed the following description of the prior art:

"The injection molding of foam materials is generally accomplished by melting a mixture of a foamable material and a blowing agent at a temperature sufficient to cause foaming but at a pressure above the foamable pressure of the mixture so that the mixture is prevented from foaming. Pressure is maintained on the mixture until it is delivered to a mold assembly where, upon release of the pressure, the mixture expands and fills the mold cavity."<sup>9</sup>

B. *The Hansen Article*

A technical article entitled, "Production of Fine Cells in Extrusion of Foams," by R. H. Hansen, SPE (Society of Plastics Engineers) Journal, Volume 18, Number 1, January, 1962 (Hansen article), reports the results of the study of blowing agents and the foam extrusion process.<sup>10</sup> The following paragraph of its conclusion best summarizes its disclosure:

"Production of fine cells and high efficiency of expansion, based on the gas liberated by a chemical blowing agent, are highly desirable in the production of expanded polymeric compositions. A mechanism of bubble nucleation

is proposed which explains how these very desirable results may be achieved in expansion by extrusion techniques. *It is suggested that efficient production of small bubbles is realized when decomposition of a suitable blowing agent approaches but does not attain completion within the extruder and when decomposition of a finite portion of the undecomposed blowing agent in the extrudate continues at a sufficient rate until the expansion process is completed. Thus, in order to produce small cell structure at high efficiency, optimum extrusion conditions are determined by selecting a suitable blowing agent which had decomposition characteristics that are compatible with the time-temperature requirements of the polymer and processing equipment.*" [Emphasis added.]

The Hansen article teaches a process which consists of the following elements: (a) an extrusion process, (b) in which a mixture of a plastic resin and a blowing agent, (c) is heated to a temperature at which decomposition approaches but does not attain completion at the extruder, and (d) with additional decomposition occurring as the expansion process is completed.

It should be noted that the Hansen article does not disclose a foam injection molding process. More importantly, although it mentions the possibility that the temperature in the machine can be maintained below the decomposition temperature of the blowing agent, the essential teaching of the article is away from that concept. Ultimately, it recommends that the mixture of plastic and blowing agent should be maintained at a temperature at which decomposition approaches completion. Such a teaching is inconsistent with the disclosures of the Patents-in-suit.<sup>11</sup>

### C. *The Beyer Patent*

United States Patent 3,058,161, which is entitled "Method of Molding Expandable Thermoplastic Resinous Beads," and issued to Carlton E. Beyer and Robert P. Dahl on October 16, 1962 (Beyer Patent) discloses an injection foam molding process. The single claim states:

"Method for molding expandable granules of thermoplastic resinous material into sandwich construction molded foam structures which comprises charging a mass of said granules into the dischargeable injection chamber of an injection molding apparatus; then, in intermittent molding cycles, forcing said mass under pressure sequentially in and through a first cold zone in said chamber wherein a portion of said mass is compacted in solid granular form while being maintained at a temperature beneath its foaming temperature; a second heated zone adjacent to the first zone in said chamber wherein a portion of said mass is heated to a flowable condition under the application of an adequate quantity of heat to cause it to attain a foaming temperature; the solid compacted portion of the mass in the first zone continuously maintaining the heated portion of said mass in the second zone restrain substantial foaming therein throughout said intermittent cycles; and a discharge zone in said chamber from which a portion of said heated mass is injected to fill a retractable mold form having an enlargeable cavity wherein the injected mass is initially exteriorly cooled against the mold form to form a solidified surface layer while being maintained

under pressure; and finally relieving the pressure and enlarging the mold form to permit the central, relatively uncooled heated mass to expand and force the solidified surface layer against the enlarged confining limits of the mold form to form said sandwich construction molded foam structure."

Thus, this Patent discloses a process that contains the following elements: (a) a foam injection molding process for producing sandwich construction molded foam structures, (b) in which a mixture of a blowing agent and a plastic resin, (c) is heated in the barrel of an injection machine to the foaming temperature of the blowing agent, (d) but in which pressure is utilized to restrain foaming, (e) and in which this pressure is maintained not only until the mixture is injected into an expandable mold, (f) but also until the surface layer of the mixture has cooled and solidified, (g) at which time the pressure is relieved by expanding the mold, and (h) thereby allowing the uncooled interior portion of the mixture to expand, foam, and then cool and solidify.

The Beyer Patent specifically teaches complete decomposition of the blowing agent in the barrel of the machine, contrary to the Patents-in-suit.

#### D. *The DuPont Report*

An informal DuPont Report, entitled "Injection Molding of DuPont Elastomers," dated January, 1964, (DuPont Report) describes the conventional (non-foam) injection molding process in a general and fundamental way. It describes the operation of injection molding machines, and then discusses the coordination of various process parameters, including reserve stock temperature, nozzle diameter, mold temperature, injection pressure,

clamp time, and form of feed stock. The body of the Report is a discussion of the characteristics of several DuPont elastomers.

However, the DuPont Report does not relate to a foam injection molding process at all, and, as a consequence, it discloses nothing with regard to the specific problems associated with foaming. Although it discusses the effect of nozzle diameter and injection pressure on heat build-up at the orifice, this teaching is very general and does not relate to the coordination of these process parameters to effect foaming.

#### E. *The Vinatex 773 Patent*

British Patent 971,773, entitled "Improvements In or Relating to Soles for Footwear and Other Flexible Moulded Products," issued to Vinatex, Ltd., on October 7, 1964 (Vinatex 773 Patent), discloses a method by which molded products having a "multi-cellular interior portion and an exterior portion of reduced cellularity may be produced from a synthetic resin." Claims 1 and 2 state:

"1. A method of manufacturing soles for footwear and other flexible moulded products which comprises injecting a flexible thermo-plastic synthetic resin composition containing a blowing agent, into a mould cavity, heating the composition immediately prior to its entry into the mould to a temperature at which the blowing agent decomposes, cooling at least a part of the mould surfaces, maintaining the composition under pressure in the mould for a predetermined period to allow a predetermined thickness thereof to set, thereafter allowing a predetermined amount of relative movement to



take place at a controlled rate between opposed or adjacent surfaces of the mould under the influence of the pressure developed by the decomposition of the blowing agent and holding the expanded moulded product in the mould until it has cooled to a temperature at which it will be dimensionally stable.

"2. A method according to claim 1 wherein the synthetic resin composition is heated in an injection machine to a temperature at which the composition is extrudable but which is below the decomposition temperature of the blowing agent, the composition being further heated to a temperature at which the blowing agent decomposes at, or adjacent to, the discharge orifice of the injection machine."

Thus, the Vinatex 773 Patent discloses a process which possesses the following elements: (a) a foam injection molding process, (b) in which a mixture of a plastic resin and a blowing agent, (c) is initially heated in the barrel of the injection machine to a temperature below the decomposition temperature of the blowing agent, (d) and then is further heated to the decomposition temperature immediately prior to entry into the mold, at or adjacent to the discharge orifice of the injection machine, and (e) after injection into the mold, the mixture expands the mold by a predetermined amount under the influence of the pressure developed by the blowing agent.

The Vinatex 773 Patent was the first disclosure of a foam injection molding process in which the composition (mixture) is heated "to a temperature at which the composition is extrudable but which is below the decomposition temperature of the blowing agent



... " [Emphasis added.] Thereafter, this Patent discloses, "the composition being further heated to a temperature at which the blowing agent decomposes at, or adjacent to, the discharge orifice of the injection machine."

However, as Hendry testified, and DPM now agrees, this Patent does not specifically teach the use of shear friction, or indeed any specific heating method, to cause the necessary temperature rise. Moreover, as Simmonds testified, this Patent does not disclose how to coordinate the process parameters (the temperature of the melt in the barrel, the rate of injection, and the dimensions of the flow resisting zone)<sup>12</sup> to produce quality parts.

*F. The French USM Patent*

French Patent 1,568,562, issued to USM on May 23, 1969 (French USM Patent), was submitted into evidence, but no English translation was provided.<sup>13</sup>

*G. The Vinatex 191 Patent*

British Patent 1,194,191, entitled "Improvements in or Relating to the Production of Microcellular Moulded Articles," issued to Vinatex, Ltd., on June 10, 1970 (Vinatex 191 Patent), discloses an improvement upon the Vinatex 773 Patent, with respect to a new technique for expanding the mold cavity. Claim 1 thereof states:

"1. A method of moulding microcellular articles from mouldable natural or synthetic polymers, which method comprises injecting a polymer composition containing a blowing agent into a cavity in a mould and retracting one or more cores from a position wholly or partly within the cavity during or after the injection of said composition, said composition being injected into the cavity at a temperature at which it is plastic and at which the blowing agent will decompose."

Thus, the Vinatex 191 Patent discloses the same basic process as the Vinatex 773 Patent, except that it discloses the use of retractable cores, rather than a moveable plate, to expand the mold cavity.

### III.

#### THE VALIDITY OF THE PATENTS-IN-SUIT

##### A. *The Presumption of Validity*

##### (1) *THE STATUTE AND ITS INTERPRETATION*

Section 282, Title 35, United States Code, in pertinent part, provides:

"A patent shall be presumed valid. Each claim of a patent (whether in independent, dependent, or multiple dependent form) shall be presumed valid independently of the validity of other claims; dependent or multiple dependent claims shall be presumed valid even though dependent upon an invalid claim. The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity."

Regarding this statute, the United States Court of Appeals for the Sixth Circuit recently held:

"Every United States patent begins its life with a presumption of validity, 35 U.S.C. § 282, and this is the proper place for our analysis to begin [citation omitted]. [T]his presumption merely places the burden of proof of invalidity and has no independent evidentiary value." *Universal Electric Co. v. A. O. Smith Corporation*, 643 F.2d 1240, 1245 (6th Cir. 1981) (Footnotes omitted.)

Commenting upon the applicable standard of proof, the same Court stated:

"The burden of proof was upon the defendant to

establish its affirmative defenses by a preponderance of the evidence." *Saginaw Products Corp. v. Eastern Airlines, Inc.*, 615 F.2d 1136, 1140 (6th Cir. 1980)<sup>14</sup>

[1] However, this presumption of validity is weakened when the Patent Office fails to consider pertinent prior art during the prosecution of the patent. *Park-Ohio Industries, Inc. v. Letica Corporation*, 617 F.2d 450, 453 (6th Cir. 1980). This concept was explained in *American Seating Company v. National Seating Company*, 586 F.2d 611, 615 (6th Cir. 1978), cert. denied, 441 U.S. 907, 99 S.Ct. 1999, 60 L.Ed.2d 377 (1979):

"The degree by which the presumption is weakened in cases in which relevant prior art was not considered by the Patent Office, depends upon a balancing of pertinence of the newly cited prior art and the pertinence of the prior art actually considered by the patent examiner in the prosecution of the patent application."

[2] Thus, the determination of the weight to be given to the statutory presumption of validity is a three step process. First, the art, which constitutes "prior" art, must be identified. Second, the prior art, which was not considered by the Patent Office, must be identified. Third, the pertinence of the newly cited prior art must be compared to the pertinence of the prior art that was actually considered.

## (2) THE "PRIOR" ART

[3] The initial inquiry is whether the prior art references, which were relied upon by DPM, constitute "prior" art. USM agrees that all of DPM's cited references constitute prior art against both Patents-in-suit, with one exception. USM contends that the Vinatex 191 Patent,

which was issued on June 10, 1971, does not constitute prior art against the 989 Patent. This contention is based upon the fact that the application for the 989 Patent, which was filed on May 8, 1972 (after the date of the Vinatex Patent), was actually a continuation-in-part of an application that had been previously filed on June 9, 1967. USM contends that (a) it is entitled to the benefit of the first filing date (June 9, 1967), and (b) as a result, the Vinatex 191 Patent is not "prior" art under 35 U.S.C. § 120.<sup>15</sup>

In response, DPM contends that, because the original application and the first continuation-in-part did not meet the requirements of 35 U.S.C. § 120 (specifically the disclosure requirements of 35 U.S.C. § 112, which are incorporated by reference), USM is bound to the date of the specific application which resulted in the 191 Patent (May 8, 1972), and, therefore, the Vinatex 191 Patent does constitute "prior" art.

USM denies this argument, asserting that the original application and the first continuation-in-part application did meet the requirements of 35 U.S.C. § 120, including the disclosure requirements of 35 U.S.C. § 112.

The resolution of these issues would involve an analysis of whether the original application and the first continuation-in-part application did, or did not, meet the requirements of 35 U.S.C. § 112.<sup>16</sup>

However, the Court finds that resolution of these issues is unnecessary to the ultimate determination of the validity issue because the Court hereinafter finds that the consideration of the Vinatex 191 Patent as prior art against the 989 Patent does not affect its validity. Thus, the Court will not decide these issues, and will assume, without actually deciding, that the Vinatex 191

Patent is "prior" art against the 989 Patent.

Furthermore, the Court will consider that all of the prior art references, which have been cited by DPM, do constitute "prior" art against both Patents-in-suit.

(3) *THE PRIOR ART THAT WAS NOT CONSIDERED BY THE  
PATENT OFFICE*

With regard to an identification of the prior art that was not considered by the Patent Office, DPM contends, and USM does not dispute, that neither the DuPont Report nor the Vinatex 191 Patent were considered.<sup>17</sup> Thus the relative pertinence of these two prior art references will be determined.

(4) *THE RELATIVE PERTINENCE OF THE PRIOR ART THAT  
WAS NOT CONSIDERED*

With respect to the relative pertinence of the DuPont Report, Simmonds testified that it was not as pertinent as other prior art which was before the Patent Office, specifically British Patent 1,023,888. DPM did not submit any evidence to the contrary. Having reviewed the DuPont Report, the Court agrees with Simmonds' conclusion. This Report neither specifically relates to any foam injection molding process nor to a process which is similar to that disclosed in the Patents-in-suit.<sup>18</sup> Thus, the Court finds that the DuPont Report is not as pertinent as other prior art which was before the Patent Office in the prosecution of the Patents-in-suit.

With regard to the relative pertinence of the Vinatex 191 Patent, Simmonds testified that it disclosed the same process as British Patent 1,194,192 (also issued to Vinatex), which was before the Patent Office. In the absence of contrary evidence, and after having reviewed the Vinatex 191 and 192 Patents, the Court can find no basis upon which to discredit Simmonds' testimony.

Accordingly, the Court determines that the Vinatex 191 Patent is not more pertinent than other prior art that was before the Patent Office in the prosecution of the Patents-in-suit.<sup>19</sup>

(5) *CONCLUSION*

The Court finds that the prior art, which was not considered by the Patent Office, is not more pertinent than the prior art that was considered. Therefore, the Court determines that, under 35 U.S.C. § 282, USM is entitled to the full weight of the presumption of validity with respect to both Patents-in-suit. Thus, DPM bears the full burden of proving its defenses under sections 102, 103, and 112 by a preponderance of the evidence.

B. *DPM's Validity Challenge Under Section 102*

(1) *DPM's CONTENTIONS*

DPM contends that the Patents-in-suit, having been anticipated by the Vinatex 773 Patent and the Vinatex 191 Patent, were granted in violation of 35 U.S.C. § 102(a).<sup>20</sup> DPM also contends that, inasmuch as the 686 Patent was in public use for more than one year prior to the filing date of the application upon which that Patent was issued, it was granted in violation of 35 U.S.C. § 102(b). The burden of proof as to these issues is upon DPM.

(2) *THE STATUTE AND ITS INTERPRETATION*

Section 102, Title 35, United States Code, provides in pertinent part:

"A person shall be entitled to a patent unless —

"(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or



"(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States."

In construing subsection (a) of this section, the United States Court of Appeals for the Sixth Circuit has stated:

"In order to anticipate an invention, it is necessary that all of the elements of the invention or their equivalents be found in one single description or structure, where they do substantially the same work in substantially the same way." *Allied Wheel Products, Inc. v. Rude*, 206 F.2d 752, 760 (6th Cir. 1953), quoted in *Lucerne Products, Inc. v. Cutler-Hammer, Inc.*, 568 F.2d 784, 795 (6th Cir. 1977).

See also *Nickola v. Peterson*, 580 F.2d 898, 907 (6th Cir. 1978), cert. denied, 440 U.S. 961, 99 S.Ct. 1504, 59 L.Ed.2d 774 (1979); *Smith v. Acme General Corporation*, 614 F.2d 1086, 1088 n.6 (6th Cir. 1980).

### (3) ANTICIPATION BY THE VINATEX 773 PATENT

[4] In support of its contention that the Vinatex 773 Patent anticipated the Patents-in-suit, DPM relies upon Hendry's testimony that the process, which is disclosed in the Patents-in-suit, is "identical" to the process which is disclosed in the Vinatex 773 Patent. However, he later testified that the Vinatex 773 Patent does not specifically disclose the use of shear friction during injection to raise the temperature of the melt to the foaming temperature. Under *Allied Wheel Products v. Rude*, *supra*, his testimony would not support a finding that the Vinatex 773 Patent anticipated the Patents-in-suit, because not "all the elements" of the Patents-in-suit are found in the Vinatex

773 Patent. Moreover, there is no other evidence that would support such a finding. Simmonds not only agreed with Hendry's testimony, he found other differences in the processes disclosed.

Thus, the Court finds that DPM has not proven that the Vinatex 773 Patent anticipated the Patents-in-suit by a preponderance of the evidence.<sup>21</sup>

**(4) ANTICIPATION BY THE VINATEX 191 PATENT**

[5] In support of its contention that the Vinatex 191 Patent anticipated the Patents-in-suit, DPM relies upon Simmonds' testimony<sup>22</sup>, which it contends constitutes a concession "that the '989/'686 process is indistinguishable from the process of the [Vinatex] 191 Patent."<sup>23</sup> However, the Court finds two difficulties with this argument. First, Simmonds' testimony related solely to the 989 Patent, not the "989/686 process." Second, his testimony did not relate solely to the Vinatex 191 Patent. Rather, it related to both the Vinatex 191 Patent and the Vinatex 192 Patent. But DPM has not relied upon the Vinatex 192 Patent as prior art against either of the Patents-in-suit. Moreover, under the precedent cited and quoted above, anticipation contemplates a reference to a single prior art source such as a single prior patent, but not to a combination of two prior sources such as two prior patents. Therefore, the Court finds that DPM has not proven by a preponderance of the evidence that the Vinatex 191 Patent anticipated the Patents-in-suit.<sup>24</sup>

**(5) THE PUBLIC USE OF THE 686 PATENT**

[6] As noted, DPM further contends that the process disclosed in the 686 Patent was in public use for more than one year prior to January 24, 1972, which was the filing date of the application upon which the 686 Patent was based. If DPM carries its burden of proof on this

issue, then the 686 Patent would be invalid under 35 U.S.C. § 102(b).

The only evidence that was submitted by DPM on this issue is a letter, dated December 29, 1970, which had been sent by USM's patent counsel, Peter Tavernini (Tavernini), to the Patent Office. This letter requested a license to file a patent application in Japan:

"In accordance with Public Law 256, approved February 1, 1952, we respectfully request that a necessary License be granted to file a patent application outside the United States, specifically in Japan, based upon the enclosed specification (including claims) entitled:

'Method of Injection Molding Articles of Foam Material'

"A United States Patent Application, Serial No. 767,682 was filed October 15, 1968 in the names of William T. Kyritsis and Robert Simmonds. This application was handled by Division 146. Among other countries, a Convention application was filed on its subject matter in Japan. Messrs. Kyritsis and Simmonds subsequently developed a novel method which is disclosed in the enclosed specification. Unfortunately, a U. S. application cannot be filed on said method since it was publicly disclosed more than a year ago. Japanese patent regulations still permit the obtaining of valid protection in Japan and commercial prospects make patent protection desirable there. Hence, permission to effect filing in Japan is hereby requested.

"As negotiations with prospective licenses in Japan are pending it would be appreciated if the

granting of the requested license could be expedited, so that no protection in Japan will be forfeited.

"A duplicate copy of this petition letter is enclosed." [Emphasis added.]

DPM contends that this letter by itself constitutes an admission that the subject matter of the 686 Patent was barred from patent protection in the United States due to its prior public disclosure. USM denies that the Tavernini letter constitutes any such admission, in light of a subsequent explanation which was found in a June 14, 1973 amendment to the application for the 686 Patent by Benjamin Pollard (Pollard), another patent attorney for USM. This amendment stated in pertinent part:

"At this time attention is directed to statements made in requesting a Foreign Filing License under which an application corresponding to the above was filed in Japan on January 29, 1971. That license request indicated that the method was publicly disclosed more than a year prior to December 29, 1970. Applicants' attorney has questioned the inventors and has investigated the acts on which the statements in the license request were based. According to the information secured, *the process disclosed included a time delay after injection of the molten mixture of resin and blowing agent into a cold mold so that the cooling solidified portions of the mixture before expansion so as to form a thick unblown surface layer which remained in the final product.* The claims in their present form exclude this process and, as noted above, secure advantages over it so that the early disclosure should not be held a bar to the present claims." [Emphasis added.]

The Court finds that the language of both of these documents is so ambiguous that it is unable to draw any conclusion from them upon this issue. The Tavernini letter neither discloses the claims sought to be filed in Japan nor the method that had been publicly disclosed. Rather, it makes reference to a "novel method which is disclosed in the enclosed specifications." But those "enclosed specifications" were never made a part of this record. The letter, by itself, simply does not provide sufficient information with which to enable this Court to make a finding concerning the process that was "publicly disclosed more than a year ago."

Likewise, Pollard's attempt in the amendment is to identify the process that had been publicly disclosed is too vague to be effective. The key sentence in the Pollard amendment is the fourth sentence, which has been emphasized in the quote above. However, this sentence simply does not identify the process that had been publicly disclosed in a manner that is comprehensible to the Court.

The only other evidence on the issue of the prior public disclosure of the 686 Patent was provided by Simmonds. He testified that 1) the process disclosed in the 686 Patent was not used publicly anywhere in the world before January 24, 1971, 2) it was first used in Japan during the spring or summer of 1971, and 3) because of his close involvement in the development of this process, he was in a position to know these facts. DPM submitted no direct evidence of public use prior to January 24, 1971, and no other basis upon which to discredit Simmonds' testimony.

In light of the ambiguity of the documents and the

uncontroverted testimony of Simmonds, the Court finds that DPM has not sustained its burden of proving by a preponderance of the evidence that the process disclosed in the 686 Patent was in public use prior to January 24, 1971.

(6) CONCLUSION

The Court finds that DPM has failed to prove that the Patents-in-suit were granted in violation of 35 U.S.C. § 102 by a preponderance of the evidence. Therefore, the Court will not hold that the Patents-in-suit are invalid on that ground.

(C) *DPM's Validity Challenge Under Section 103*

(1) *THE STATUTE AND ITS INTERPRETATION*

Section 103, Title 35, United States Code, provides:

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."

In construing this section, the United States Supreme Court has stated:

"Under § 103, the scope and content of the prior art are to be determined; differences between prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against the background, the obviousness or nonobviousness of the subject



matter is determined." *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 694, 15 L.Ed.2d 545 (1966)

See also: *Dann v. Johnston*, 425 U.S. 219, 96 S.Ct. 1393, 47 L.Ed.2d 692 (1976); *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273, 96 S.Ct. 1532, 47 L.Ed.2d 784 (1976); *Anderson's Black Rock, Inc. v. Pavement Salvage Co., Inc.*, 396 U.S. 57, 90 S.Ct. 305, 24 L.Ed.2d 258 (1969).

The Court has already determined the scope and content of the prior art.<sup>25</sup> The Court will now resolve the level of ordinary skill in the pertinent art. Thereafter the Court will ascertain the differences between the prior art and the claims at issue, and determine the obviousness or nonobviousness of each claim.

(2) *THE LEVEL OF ORDINARY SKILL IN THE  
PERTINENT ART*

The parties agree that the pertinent art is the foam plastic injection molding art. The Court finds that everyone of ordinary skill in that art throughout the relevant time period was fully knowledgeable in the conventional (non-foam) plastic injection molding art.<sup>26</sup> However, in 1967, the techniques of foam plastic injection molding were still under development and although several substantial firms were conducting research into this new field, there was not yet a commercially successful process. The Beyer Patent was assigned to Dow, which attempted to promote the process but later withdrew its efforts. Union Carbide also unsuccessfully attempted to promote a foam process. Thus, the Court concludes that in 1967 the level of ordinary skill in the art of foam plastic injection molding was low, and certainly much lower than the level of ordinary skill in the art of conventional plastic injection molding.

(3) *THE PARTIES' CONTENTIONS REGARDING  
OBVIOUSNESS*

DPM contends that (a) each step of the Patents-in-suit was known in the prior art, (b) there was no significant technical difference between the prior art and the Patents-in-suit, and (c) the only step in the Patents-in-suit, which was not expressly disclosed in the prior art, is the use of shear friction at the outlet of the machine to raise the temperature of the mixture above the decomposition temperature of the blowing agent. Thus, DPM contends that the Patents-in-suit were "obvious" within the meaning of 35 U.S.C. § 103.

USM contends that, although the prior art disclosed an injection molding process in which a thermoplastic material and a blowing agent is injected from a supply reservoir into a mold cavity, the prior art did not disclose all the precise elements of the claims of the Patents-in-suit. Thus, USM contends that the Patents-in-suit were not "obvious."

The Court will hereinafter review Claims 1, 2, and 3 of each Patent-in-suit<sup>27</sup>, in order to ascertain the differences between them and the prior art, and to determine their obviousness or nonobviousness.

(4) *CLAIM 1 OF THE 989 PATENT*

[7] Claim 1 of the 989 Patent states:

"1. Process for molding articles of foamed material comprising forming a molten mixture of a foamable heat-softenable organic polymeric resinous material and a blowing agent in a chamber at a temperature maintained at all times below the foaming temperature of said blowing

agent-polymeric material system, maintaining the mixture within the chamber at a level below said foaming temperature at all times to prevent expansion of the mixture and rapidly forcing a mass of said molten mixture from said chamber to the ingress opening of and through a flow resisting zone for discharge through an egress opening into a mold cavity, coordinating the temperature of the mixture in said chamber, the resistance to flow in said zone resulting from the length and cross sectional dimensions of said flow resisting zone and the rate of forcing said mixture through said zone to frictionally generate by viscous dissipation the controlled final increment of heat in flow of the mixture through said zone to raise the temperature of said mixture during passage through said zone from said temperature below the foaming temperature to said foaming temperature when said mixture reaches said egress opening, and to discharge said mixture from said egress opening into said mold cavity in substantially non-foamed condition and permitting the generation of gas from said blowing agent to expand said mixture in said cavity at said foaming temperature."

Thus, Claim 1 of the 989 Patent discloses a process which consists of the following elements: (a) a foam injection molding process, (b) in which a mixture of a blowing agent and a polyresinous material, (c) is maintained at all times below the foaming temperature of the blowing agent while it is in the barrel of an injection machine, (d) and in which the mixture is raised to a temperature above the foaming temperature of the

blowing agent during injection, (e) by coordinating the temperature of the mixture in the barrel with the final increment of heat added to the mixture during injection, (f) which increment of heat is controlled by coordinating the rate of injection with the dimensions of the flow resisting zone, (g) all such that the mixture is substantially non-foamed when it enters the mold, and (h) then foams and expands in the mold as gas is generated from the blowing agent.

The Court finds that in 1967, Annis and Kyritsis were the first to combine these process elements. Although the prior art (Vinatex 773 Patent) had disclosed a foam injection molding process in which the mixture in the barrel was maintained below the decomposition temperature of the blowing agent, Annis and Kyritsis were the first to coordinate all the pertinent process parameters, such that the mixture would be injected into the mold cavity in a substantially non-foamed condition. This coordination was disclosed in a very specific way in Claim 1 of the 989 Patent and in the detailed specifications.<sup>28</sup> Thus, the Court finds that there was a substantial difference between the prior art and Claim 1 of the 989 Patent, and that the disclosure of Claim 1 of the 989 Patent would not have been obvious to one of ordinary skill in the art.

#### (5) CLAIM 2 OF THE 989 PATENT

Claim 2 of the 989 Patent states:

"2. The invention according to claim 1 including the additional step of causing said mold cavity to extend after said filling of the mold cavity whereby to facilitate foaming of the mixture."

Claim 2 of the 989 Patent incorporates the process disclosed in Claim 1, with the additional step of causing

the mold cavity to extend after filling "to facilitate foaming of the mixture." This broad teaching was disclosed in the Beyer Patent and in the Vinatex 773 Patent. Thus, the Court finds that there was no difference between the prior art and Claim 2 of the 989 Patent, and that Claim 2 of the 989 Patent would have been obvious to one of ordinary skill in the art.

(6) *CLAIM 3 OF THE 989 PATENT*

Claim 3 of the 989 Patent states:

"3. The invention according to claim 1 wherein the temperature of the mixture within the chamber is controlled by a heat transfer means."

Claim 3 of the 989 Patent incorporates the process disclosed in Claim 1, with the additional step of using a heat transfer means to control the temperature of the mixture in the barrel. The DuPont Report demonstrates that this concept was widely known. Accordingly, the Court finds that there was no difference between the prior art and Claim 3 of the 989 Patent, and that Claim 3 of the 989 Patent would have been obvious to one of ordinary skill in the art.

(7) *CONCLUSIONS REGARDING THE 989 PATENT*

In summary, the Court finds that there was a substantial difference between the prior art and Claim 1 of the 989 Patent, and that DPM has failed to prove by a preponderance of the evidence that this claim was "obvious" within the meaning of 35 U.S.C. § 103. Therefore, the Court will not hold that Claim 1 of the 989 Patent was allowed in violation of 35 U.S.C. § 103. However, the Court further finds that there was no difference between the prior art and Claims 2 and 3 of the 989 Patent, and that these claims were "obvious" within the meaning of 35 U.S.C. § 103. Thus, the Court

does hold that Claims 2 and 3 of the 989 Patent were allowed in violation of 35 U.S.C. § 103, and are invalid.

(8) *CLAIM 1 OF THE 686 PATENT*

[8] Claim 1 of the 686 Patent provides:

"1. The method of injection of molding articles, including the steps of forming a freely fluid molten mixture of a resinous injection molding material and a chemical or liquid to gas blowing agent while maintaining the mixture below the foaming temperature of the blowing agent, characterized by the fact that the temperature of the mixture is raised to a temperature at least equal to the normal foaming temperature of the mixture directly before injection of the mixture into the mold, the mixture is introduced into an expandable mold cavity having cold inner walls at a rate substantially to fill the mold cavity during the induction period of the blowing agent, the temperature of said inner walls being below the blowing temperature of the blowing agent and being sufficiently low to cool the portion of the mixture which contacts the cold inner walls of the mold below the blowing temperature of the blowing agent to arrest generation of blowing gas from the blowing agent in said portion of the mixture but not so cold as to cool said portion to a temperature below the softening point of said resinous material and solidify it prior to increasing the volume of the mold cavity, the volume of the mold cavity is increased beginning at a time at which substantially the entire mixture is in freely fluid state and blowing gas is generated in that portion of the mixture which is



not in contact with the cold mold walls to foam the mixture."

This Claim discloses improvements upon the foam injection molding process which were disclosed in the 989 Patent. Specifically, the improvements disclosed include: (a) The mold cavity is substantially filled during the induction period of the blowing agent, (b) the mold walls are cooled sufficiently to arrest the generation of gas in the portion of the mixture immediately adjacent to the mold surface, but not so much that this portion of the mixture begins to solidify prior to expansion of the mold, and (c) the mold is expanded while the mixture is freely fluid (before it begins to solidify) and while gas is being generated in that portion of the mixture not in contact with the walls.

The Court finds that the first improvement, which was disclosed in Claim 1 of the 686 Patent (relating to injection during the induction period), was not an improvement at all since this element is found in Claim 1 of the 989 Patent. That earlier Claim disclosed that the mixture is discharged into the "mold cavity in substantially non-foamed condition." By definition, the mixture is substantially non-foamed during the induction period. These claims merely describe the same element with different words. As a consequence, the Court holds that the disclosure of Claim 1 of the 686 Patent, (relating to the timing of injection during the induction period) would have been obvious to a person of ordinary skill in the art at the time of the "invention" disclosed in the 686 Patent.

However, the Court finds that the second improvement, which was disclosed in Claim 1 of the 686 Patent (relating to cooling the mold walls), would not

have been obvious to a person of ordinary skill in the art. That claim discloses to cool the mold walls sufficiently to arrest decomposition adjacent thereto, but not so much that the mixture begins to solidify before mold expansion. Although the disclosure therein to cool the mold walls sufficiently to arrest decomposition adjacent thereto was made in Claim 6 of the 989 Patent<sup>29</sup>, the disclosure in Claim 1 of the 686 Patent not to cool the mold walls so much that the mixture will solidify before mold expansion was not disclosed in any prior art reference.<sup>30</sup> All three prior art references that disclose an expandable mold, the Beyer Patent, the Vinatex 773 Patent (Claim 1), and the Vinatex 191 Patent (Claim 10)<sup>31</sup>, disclose to expand the mold *after* solidification of the mixture adjacent to the mold walls. Therefore, the Court finds that this specific disclosure would not have been obvious to a person of ordinary skill in the art.

Likewise, the third improvement, which was disclosed in Claim 1 of the 686 Patent (relating to the timing of the mold expansion), is substantially different from the prior art disclosures relating thereto. As noted, Claim 1 of the 686 Patent discloses to expand the mold after the gas is generated and while the mixture is still freely fluid. Initially, the Court notes that this disclosure is more specific than the disclosure of Claim 2 of the 989 Patent, which simply discloses to expand the mold after filling it "to facilitate foaming of the mixture."

Moreover, the Court notes that the disclosure in Claim 1 of the 686 Patent (relating to the timing of the mold expansion) is also substantially different from the other prior art disclosures. As noted, all three prior art references that disclose an expandable mold disclose to expand the mold after solidification commences, not before.

Therefore, the Court finds that the third improvement, which was disclosed in Claim 1 of the 686 Patent (relating to the timing of the mold expansion), would not have been obvious to a person of ordinary skill in the art.

The Court, after considering Claim 1 of the 686 Patent as a whole, also finds that DPM has failed to prove that the improvements which were disclosed therein would have been obvious to a person of ordinary skill in the art by a preponderance of the evidence.

(9) CLAIM 2 OF THE 686 PATENT

Claim 2 of the 686 Patent discloses:

"2. Method of injection molding articles as defined in claim 1 in which the increment of heat needed to raise the temperature of the mixture is generated frictionally by forcing the mixture through a passageway at a rate coordinated with the length and cross section of the passageway to supply the increment of heat which will bring the temperature of the mixture to foaming temperature."

The Court finds that this disclosure is precisely the same disclosure which is found in Claim 1 of the 989 Patent. Both Claims disclose the coordination of the rate of injection with the dimensions of the flow resisting zone in order to supply the increment of heat necessary to raise the temperature of the mixture to the decomposition temperature during injection. Thus, the Court finds that there is no difference between Claim 2 of the 686 Patent and the prior art, and as a result, Claim 2 of the 686 Patent would have been obvious to a person of ordinary skill in the art.

(10) CLAIM 3 OF THE 686 PATENT

Claim 3 of the 686 Patent discloses:

"3. Method of injection molding articles as defined in Claim 2 in which said blowing agent is a chemical compound which generates blowing gas by thermal decomposition."

The Court finds that this disclosure is precisely the same disclosure found in Claim 5 of the 989 Patent.<sup>32</sup> Both Claims disclose the use of chemical blowing agents that are decomposed by heat. Accordingly, the Court finds that there is no difference between Claim 3 of the 686 Patent and the prior art, and as a result, Claim 3 of the 686 Patent would have been obvious to a person of ordinary skill in the art.

(11) CONCLUSIONS REGARDING THE 686 PATENT

In summary, the Court finds that (a) there was a substantial difference between Claim 1 of the 686 Patent and the prior art, and (b) DPM has failed to prove by a preponderance of the evidence that this claim was "obvious" within the meaning of 35 U.S.C. § 103. Thus, the Court will not hold that Claim 1 of the 686 Patent was allowed in violation of 35 U.S.C. § 103. However, the Court further finds that (a) there was no difference between the prior art and Claims 2 and 3 of the 686 Patent, and (b) these claims were "obvious" within the meaning of 35 U.S.C. § 103. As a consequence, the Court does hold that Claims 2 and 3 of the 686 Patent were allowed in violation of 35 U.S.C. § 103, and are deemed to be invalid.

D. *DPM's Validity Challenge Under Section 112*

(1) *THE STATUTE*

Section 112, Title 35, United States Code, provides in pertinent part:

"The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

"The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."

DPM contends that the Patents-in-suit were granted in violation of this section, in that the Patents-in-suit (a) do not contain a description adequate to enable any person skilled in the art to practice it, (b) do not set forth the best mode of carrying out the inventions, and (c) do not particularly point out and distinctly claim the subject matter of the invention. USM contends otherwise. The Court will consider DPM's three contentions separately.

(2) *THE ENABLEMENT REQUIREMENT*

[9] Rudolph Tuten (Tuten), a plant manager for DPM, testified that the Patents-in-suit do not contain an adequate disclosure. The entire extent of that testimony is as

"Q. Would you be able to follow those Patents to produce production parts at DPM?

"A. No."31

The Court finds that this evidence does not provide any basis upon which to hold that the Patents-in-suit do not meet the enablement requirement. The testimony is conclusory, and no basis for the conclusion was provided. Moreover, the testimony was flatly contradicted by Simmons and Chabot.

Hendry also testified that although having tried, he was unable to practice the processes which have been described in the Patents. However, it appears that Hendry did not attempt to follow the Patents very precisely. For example, he did not use an expandable mold.

There was no other evidence on point<sup>34</sup>, and the Court can find nothing in the Patents-in-suit that would prevent anyone who is skilled in the plastic injection molding art from practicing the processes which have been described therein.

Thus, the Court holds that DPM has failed to prove that the Patents-in-suit do not meet the enablement requirement of 35 U.S.C. § 112 by a preponderance of the evidence.

### (3) THE BEST MODE REQUIREMENT

The basis of DPM's contention that the Patents-in-suit do not disclose the best mode to practice them is the deposition testimony of Kyritsis, a co-inventor of the 989 Patent, to the effect that he designed a special screw for use in the process. In support of this contention, DPM cites *Union Carbide Corp. v. Borg Warner Corp.*, 550 F.2d 355 (6th Cir. 1977), in which the inventor failed to disclose a special valve and nozzle design that he had found prior to filing his patent application. It was specifically determined that these designs were important to the process which had been disclosed in the



patent, in that they had solved certain previously existing problems and significantly improved the process.

*Union Carbide Corp. v. Borg Warner Corp.*, *supra*, is inapposite to this controversy because the Court cannot find in the present cause that the special screw design is necessary to the processes which have been disclosed in the Patents-in-suit. A key feature of the Patents-in-suit is that the temperature of the mixture in the barrel is maintained below the decomposition temperature of the blowing agent. The Patents-in-suit fully disclose the necessary coordination of process parameters for accomplishing that purpose, and there is no evidence that the "best mode" for accomplishing that purpose was not disclosed. Although the special screw was designed by Kyritsis to help accomplish that purpose, the same thing could be accomplished equally as well with commercially available screws, by simply adjusting other process parameters. There is no evidence that this special screw is necessary to practice the process. Both Kyritsis and Simmons testified that the process can be practiced on any conventional injection machine. As determined hereinafter, DPM practices the Patents-in-suit quite successfully, and there is no evidence that it required any such special screw.

Therefore, the Court holds that DPM has failed to prove by a preponderance of the evidence that the Patents-in-suit do not disclose the best mode which was contemplated by the inventor for carrying out the invention.

#### (4) THE DISTINCT CLAIM REQUIREMENT

The sole basis of DPM's contention in this regard is the testimony of McDougall to the effect that the claims

are not "clear and lucid." The only specific example provided by McDougall on this issue was his opinion that the term "foaming temperature," as used in the Claim 1 of the 989 Patent, appeared to have two inconsistent definitions, neither of which were clear.

The difficulty with this argument is that although McDougall is obviously an experienced patent attorney, he cannot be considered to be a person of ordinary skill in the foam plastic injection art. He is not in a position to conclude that the Patents-in-suit are not clear and lucid.<sup>35</sup>

There was absolutely no evidence that anyone within the industry experienced any difficulty in understanding the Patents-in-suit.

Accordingly, the Court finds that DPM has not proven that the Patents-in-suit do not particularly point out and distinctly claim the subject matter of the invention by a preponderance of the evidence.

#### (5) CONCLUSION

In summary, as a result of DPM's failure of proof on this issue, the Court will not hold that the Patents-in-suit were granted in violation of 35 U.S.C. § 112.

### IV.

#### INFRINGEMENT

##### A. *The Statutes*

35 U.S.C. § 271(a) provides in pertinent part, "[w]hoever without authority makes, uses or sells any patented invention, within the United States during the term of the patent therefore, infringes the patent."

##### B. *The Contentions of the Parties Regarding Infringement*

In 1975, the General Motors Corporation, Chevrolet Division, contracted with DPM to supply foam plastic glove box doors. USM contends that DPM, in

manufacturing these glove box doors, practices the process which was disclosed in the 989 Patent as well as the improvement thereon that was disclosed in the 686 Patent. As a result, USM contends that DPM literally infringes the Patents-in-suit. DPM denies infringement of either Patent.

Initially, the Court will review the literal infringement test. Then the Court will determine the infringement issues, regarding th 989 Patent, and the 686 Patent, respectively.

### C. *The Literal Infringement Test*

The test for literal infringement was described in *Graver Tank & Mfg. Co., Inc. v. Linde Air Products Co.*, 339 U.S. 605, 607, 70 S.Ct. 854, 855, 94 L.Ed. 1097 (1950):

"In determining whether an accused device or composition infringes a valid patent, resort must be had in the first instance to the words of the claim. If accused matter falls clearly within the claim, infringement is made out and that is the end of it."

Regarding the literal infringement test, the Court of Appeals for the Sixth Circuit has stated:

"In determining whether there is literal infringement, the words in the claim in the patent must be compared with the accused device. If the claim reads directly on the accused device, literal infringement is established." *Hanson v. Alpine Valley Ski Area, Inc.*, 611 F.2d 156, 161 (6th Cir. 1979).

See also: *Cardinal of Adrian, Inc. v. Peerless Wood Products, Inc.*, 515 F.2d 534 (6th Cir. 1975); *Acme Highway Products Corporation v. D. S. Brown Company*, 473 F.2d 849, 850 (6th Cir. 1973), cert. denied, 414 U.S. 824, 94 S.Ct.

125, 38 L.Ed.2d 57 (1973); *Kolene Corporation v. Motor City Metal Treating, Inc.*, 440 F.2d 77 (6th Cir. 1971), *cert. denied*, 404 U.S. 886, 92 S.Ct. 203, 30 L.Ed.2d 169 (1971).

[10] The starting point for the determination of this issue is the claim itself. However, "[p]atent construction is not a matter of pure literalism and slavish adherence to the words used. [Citation omitted.] It is the real invention claimed and granted protection which we seek to determine." *Weidman Metal Masters Co., Inc. v. Master Corporation*, 623 F.2d 1024, 1029 (5th Cir. 1980), *cert. denied*, 450 U.S. 982, 101 S.Ct. 1519, 67 L.Ed.2d 818 (1981). "Decision of an infringement claim requires a court to look at the heart of the invention. If it is appropriated, the patent is infringed." *Id.* at 1030.

#### D. Infringement of the 989 Patent

[11] (1) As noted, the determination of an infringement issue turns upon whether Defendant has appropriated the heart of Plaintiff's invention. The heart of the invention, which was disclosed in the 989 Patent, lies in its specific disclosure to control the increment of heat added to the mixture during injection so that its temperature is raised from below to above the decomposition temperature of the blowing agent, by coordinating the dimensions of the flow resisting zone and the injection rate. USM argues that DPM does precisely that in its manufacture of glove box doors for General Motors. On the other hand, DPM contends that it practices the process which was described in the Beyer Patent (the Dow process). In reviewing these contentions, it will be helpful initially to review the similarities between the Dow process and the process which was disclosed in the 989 Patent, and then to review the differences between them.

(2) Some basic elements of these two processes are essentially similar. Both Patents disclose a foam injection molding process for producing sandwich construction foam plastic parts. Both Patents disclose to heat a mixture of plastic resin and blowing agent in an injection machine barrel until the mixture is fluid, and then to inject that fluid mixture into an expandable mold.

DPM does not deny that its process includes these very basic elements.

(3) There is, however, one substantial difference between these processes, relating to the temperature of the mixture in the barrel of the injection machine. Whereas this temperature in the Dow process is maintained above the decomposition temperature of the blowing agent, in the process disclosed in the 989 Patent this temperature is maintained below the decomposition temperature.

Thus, DPM argues that, in its practice of the Dow process, it maintains the temperature of the mixture in its barrel above the decomposition temperature of its blowing agent. USM contends otherwise.

The Court notes that the parties have considered this issue to be *the* crucial issue with respect to USM's claim of infringement of the 989 Patent, and the Court agrees. This difference between these processes is essentially the only substantive difference. Thus, the determination of USM's claim of infringement of the 989 Patent flows directly from the determination of whether the temperature of the mixture in the barrel of DPM's injection machine is above or below the decomposition temperature of its blowing agent. If it is above, then DPM does not infringe on the 989 Patent. If it is below, then DPM does infringe the 989 Patent.

However, the determination of whether the mixture in DPM's injection machine barrel is above or below the decomposition temperature of its blowing agent is not a simple matter. The parties disagree not only as to the temperature of the mixture in the barrel of DPM's injection machine, but also as to the decomposition temperature of its blowing agent. The Court will now review the evidence and make findings of fact as to both of these sub-issues.

(4) The evidence regarding the temperature of the mixture in the barrel of DPM's injection machine is conflicting. In December of 1977, the parties participated in an *inter partes* test at DPM's facility, in which each party was given the opportunity to measure this temperature under standard operating conditions in the presence of the other party. The parties' test results were substantially in conflict, probably because the parties employed different means to measure the temperature.

Using a hand held pyrometer, which employs the thermocouple technique, USM's representatives measured temperatures of 425°F, approximately. This temperature was measured by inserting the needle of pyrometer into the mixture during a slow injection into air. (In such a slow injection, there is little or no temperature rise due to shear friction.)

Using fiber optics equipment, which employs an infrared technique, DPM's representatives measured temperatures of 475°F, approximately. The head of this device was mounted directly in the barrel so that it was flush with the inside surface of the barrel. It measured temperatures up to three tenths of an inch away.

The Court must determine the reliability of these two techniques, and the accuracy of the specific equipment used, according to the evidence.



With respect to the reliability of the thermocouple technique to measure temperature, the evidence is overwhelming. It is the standard temperature measuring technique in the plastics industry and is used extensively by both parties in the regular course of business. DPM submitted no evidence that this technique is unreliable.

Likewise the evidence that the specific pyrometers, which were used by USM, were accurate was uncontroverted. Simmonds testified that (a) they were new at the time of the test, (b) new pyrometers are calibrated by their manufacturer prior to sale, and (c) he rechecked their calibration after the tests. Thus, testifying as an expert, he gave his opinion that the temperature measurements which he took were accurate. The Court finds no basis in the evidence upon which to discredit this opinion.

On the other hand, the accuracy and reliability of the optical equipment used by DPM was not satisfactorily established. Although a representative of the manufacturer of the equipment testified that the technique is reliable, the basis of this opinion was not provided. Moreover, Simmonds fully contradicted that opinion, and presented cogent reasons for his conclusion that the technique is "almost unbelievably inaccurate." (Transcript 3518) Finally, although the technique has been used experimentally in the plastics industry, it has not achieved nearly the same degree of acceptance as the thermocouple technique. Accordingly, the Court finds that DPM has not satisfactorily established the reliability of the infrared technique.

Even if the infrared technique itself were found to be reliable, the Court would nevertheless be required to reject DPM's contention on this issue because there was

absolutely no reliable evidence relating to the accuracy of the specific equipment used by DPM.

Therefore, on the basis of the evidence which has been submitted, the Court determines that the thermocouple technique is a reliable technique to measure temperature in these circumstances, and that the specific equipment used by USM was accurate. On the other hand, the Court finds that the evidence is insufficient to establish either the reliability of the infrared technique or the accuracy of the specific equipment used by DPM.

Finally, the Court finds that the temperature mixture in the barrel of DPM's injection machine under standard operating conditions is 425°F, approximately.

(5) Having determined the temperature of the mixture in the barrel, the Court will now determine the decomposition temperature of the blowing agent used by DPM in producing glove box doors for General Motors.

The evidence on this issue is also conflicting. DPM relies upon certain publications of the Uniroyal Company, the manufacturer of Celogan RA, which is the blowing agent used by DPM. These publications indicate that the decomposition temperature is between 400°F and 435°F. On the other hand, USM relies upon other publications of the Uniroyal Company, and of the Bee Chemical Company, the supplier of GR-10004, which is the Celogan RA dispersion used by DPM. These publications indicate that the decomposition temperature is between 446°F and 455°F. These conclusions are obviously in conflict. However, there is no basis in the evidence upon which to reconcile the conflict because the bases of these published conclusions were not submitted into evidence.<sup>36</sup>

The only substantial credible evidence on this issue

was provided by Hunter, the inventor of Celogan RA, who testified that the decomposition temperature of Celogan RA is 455°F, approximately. He further stated that if Celogan RA was heated in plastic to a temperature of 425°F for ten minutes, less than five percent of the available gas would evolve. If the same mixture was then heated for three seconds to 475°F, then ninety-five percent or more of the available gas would evolve.<sup>37</sup> Finally, Hunter disputed the published data, which was relied upon by DPM, that indicated a lower decomposition temperature.

The Court simply has no basis in the evidence or otherwise to question either the expertise or the conclusions of Hunter on this issue. His qualifications are impressive. It appeared to the Court that his conclusions regarding the behavior of Celogan RA were rationally based upon his experiments.

Thus, in resolving this issue of fact, the Court believes that the Hunter testimony is entitled to a greater weight than the published data which was relied upon by DPM. Therefore, the Court concludes that USM has proven by a preponderance of the evidence that the decomposition temperature of the blowing agent used by DPM is 455°F, approximately.

As a result of these findings, the Court further determines that the temperature of the mixture in the barrel of DPM's injection machine (425°F, approximately) is *below* the decomposition temperature of the blowing agent used by DPM (455°F, approximately). Therefore, for the reasons stated earlier, the Court finds that DPM practices and infringes the 989 Patent.

(6) The Court's conclusion that DPM practices the process disclosed in the 989 Patent is corroborated in the evidence in several other ways.

First, as part of its normal procedures, DPM diligently records the temperature readings in its barrel during standard operating conditions on Job Set-Up and Cycle cards. This is done so that these temperatures can be re-established on a day-to-day basis. Although the recorded temperatures vary somewhat, they range between 390°F and 420°F, approximately. Obviously, these temperatures are much closer to the temperatures measured by USM than to those measured by DPM.

Second, DPM's contract with General Motors *explicitly required* it to utilize the "proprietary and patented USM foam process." Recognizing this, DPM calculated its price quotes to General Motors by incorporating the royalty cost of a license of the patents. Moreover, when questioned by representatives of General Motors, Ladney gave assurances that DPM was in full compliance with its contract. The Court concludes that these uncontroverted facts amount to an admission by DPM that it uses the process which was described in the 989 Patent (and the 686 Patent) in fulfilling its contract with General Motors.<sup>38</sup>

Third, other test results which were compiled by USM during the *inter partes* test indicated infringement. Of particular significance was a test which demonstrated that when the injection rate was reduced, part quality became unsatisfactory because the required increment of heat was not added. This result is significant because, as noted above, the heart of the invention, which was disclosed in the 989 Patent, is the coordination of injection rate and other factors to effect the foaming of the blowing agent just after injection.<sup>39</sup>

Fourth, although Dow provided some initial help to

DPM in establishing its foam process, it abandoned the effort in 1976 when General Motors changed its specification regarding the plastic resin from a polymer to a copolymer. At that time Dow representatives informed DPM that its process would not work with a copolymer.<sup>40</sup> Moreover, during a deposition, Malcolm LeDuc, a Dow employee, opined that DPM does not use the Dow process in manufacturing glove box doors for General Motors. Finally, the evidence indicates that Dow was never able to produce quality parts consistently with its process. Finally, in 1977, Dow abandoned its efforts to promote the process.

Fifth, USM presented competent evidence that, prior to this litigation, several technical employees of DPM were of the opinion that DPM practiced the USM patents.

Thus, the Court concludes that the evidence fully justifies its findings that USM has proven DPM's infringement of the 989 Patent by a preponderance of the evidence.

(7) Other arguments that were advanced by DPM on the infringement issue are also unpersuasive. For example, in support of its contention that the temperature of mixture in the barrel of its injection machine is above the decomposition temperature of its blowing agent, DPM relies upon evidence that all physical samples taken directly from the barrel, either through the discharge orifice or through vent holes in the barrel, have a foamed cellular structure. DPM contends that the cellular structure of these samples demonstrates its argument concerning the temperature of the mixture in its barrel. If this temperature was below the foaming temperature, as contended by USM, these samples would not have a cellular structure.

The difficulty with the argument is that this test does replicate standard operating conditions. The difference is that even at the mixture temperature, which has been advocated by USM and previously determined by the Court (a temperature below the foaming temperature), there will be some decomposition of the blowing agent if it is held at such a temperature long enough. Hunter testified that the evolution of gas from Celogan RA is both time and temperature dependent. Moreover, the discharge of a sample of mixture into air, rather than into a mold, will result in a foamed structure, even if there is very little gas evolved. As a consequence, the Court cannot draw any inferences which are favorable to DPM from the fact that samples exhibiting a cellular structure result from discharging its mixture into air.

DPM also contends that infringement is disproven by the difference in density between its part and a similar USM part that is manufactured pursuant to a similar contract with General Motors. However, the evidence showed that this difference was simply the result of the difference in the amount of mold expansion.

Finally, DPM argues that infringement is disproven because it required in the practice of its process to apply air pressure in the mold to restrain foaming, and that without this additional pressure, it cannot produce satisfactory parts. The evidence on this point is conflicting. While representatives of DPM testified that air pressure is necessary, Simmonds testified that the process used by DPM did produce satisfactory parts without the additional pressure.

In resolving this issue, it must be noted that in one sense, it is irrelevant that DPM, in its judgment, may be



required to use air pressure on the mold to produce satisfactory parts. As long as its process includes all of the elements which were described in the 989 Patent, it infringes, regardless of whether it adds an additional element. also of significance here is that the determination of whether a part is satisfactory is highly subjective. Thus, a part made without air pressure in the mold may be deemed satisfactory by USM, but unsatisfactory by DPM.<sup>41</sup> Therefore, for these two reasons, the fact that air pressure in the mold results in more satisfactory parts does not, by itself, help DPM.

DPM's argument is pertinent only to the extent that when air pressure is removed, the resulting part has characteristics which are expected when there is foaming in the mold or in the barrel because the temperature of the mixture in the Dow process is above the foaming temperature. But there was no such evidence. When the air pressure was removed, the evidence showed that the primary result was splay on the surface of the part. However, there was no evidence which connects that splay to unrestrained foaming in the barrel or the mold.

Thus, DPM's argument that the necessity of air pressure in its process disproves infringement fails for lack of proof.

(8) The Court finds that DPM infringes Claim 1 of the 989 Patent in connection with its contract to supply glove box doors for General Motors.<sup>42</sup>

*(E) Infringement of the 686 Patent*

[12] The heart of the invention, which is disclosed in the 686 Patent, is the disclosure to cool the mold, but not so much that the mixture begins to solidify before expansion, and also to expand the mold while the entire mixture is still freely fluid.

The evidence clearly indicates that DPM cools its mold, and that it expands the mold while the mixture is still fluid. In its normal operating conditions, DPM expands its mold one second after injection. Simmonds testified that with the amount of cooling used by DPM, solidification of the mixture begins three seconds after injection. His opinion was supported by the results of tests that he performed during the *inter partes* tests. He found that when expansion of the mold was delayed beyond one second, part quality became unsatisfactory due to sink marks. This problem is to be expected when the mold is expanded after solidification commences.

DPM did not introduce any contrary evidence.

Therefore, the Court finds that DPM infringes Claim 1 of the 686 Patent in connection with its contract to supply glove box doors for General Motors.<sup>43</sup>

#### V.

#### THE CLAIMS FOR ATTORNEY FEES AND TREBLE DAMAGES

[13] As noted, each party claims that it is entitled to attorney fees pursuant to 35 U.S.C. § 285. In addition, USM contends that it is entitled to treble damages pursuant to 35 U.S.C. § 284.

35 U.S.C. § 285 provides, "The court in exceptional cases may award reasonable attorney fees to the prevailing party."

Plainly, DPM's request for attorney fees must be denied because it is not the prevailing party.

The Court will also deny USM's claim for attorney fees because this case is not an "exceptional case."

In construing 35 U.S.C. § 285, the United States Court of Appeals for the Sixth Circuit has stated:

"In order to support an award of attorney's fees in

a patent case we have previously held that these must be a showing of conduct which is unfair, in bad faith, inequitable or unconscionable. [Citations omitted.]

"In our opinion only the most frivolous of allegations should give rise to an award of attorney's fees under Section 285. Normally awards under this provision are based on the conduct of the parties, not the quality of their proof." *Eltra Corporation v. Basic Incorporated*, 599 F.2d 745, 758 (6th Cir. 1979), cert. denied, 444 U.S. 942, 100 S.Ct. 297, 62 L.Ed.2d 308 (1979).

In the present case, the Court finds that DPM's validity and infringement defenses, although not ultimately persuasive, were not frivolous. Moreover, this Court is not persuaded that DPM's conduct has been "unfair, in bad faith, inequitable, or unconscionable." The specific conduct by DPM, of which USM complains, is to be expected in a difficult and hard fought case.

[14] USM's claim of treble damages under 35 U.S.C. § 284 must also be denied. That section provides, in pertinent part:

"When damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed."

USM agrees that treble damages can be awarded only when the infringement is "willful and intentional," even though this requirement is not specifically stated in the statute. See: *Deyerle v. Wright Manufacturing Company*, 496 F.2d 45, 50 (6th Cir. 1974). Although this is a close issue, the Court finds that USM has not proven by a preponderance of the evidence that DPM's infringement

has been willful and intentional. Even though the Court has found against DPM on the infringement issue, the preponderance of the evidence indicates that Ladney *believed* that DPM practiced the Dow process rather than the USM process. In this regard, it is also significant that of a total of six patent claims at issue in the case (three in each Patent), four have been held herein to be invalid.

Thus, the Court denies USM's request for attorney fees under 35 U.S.C. § 284.

VI.

CONCLUSION

Therefore, within ten days from the date of this Memorandum Opinion, the parties shall submit to the Court a proposed Judgment, which shall provide that (a) DPM infringes Claim 1 of the 989 Patent and Claim 1 of the 686 Patent in connection with its contract to manufacture foam plastic glove box doors for General Motors Corporation, (b) Claims 2 and 3 of the 989 Patent and Claims 2 and 3 of the 686 Patent are invalid, (c) the balance of the claims of USM's Complaint and DPM's Counterclaim are dismissed, (d) neither party is entitled to attorney fees under 35 U.S.C. § 285, and (e) USM is not entitled to treble damages under 35 U.S.C. § 284.

ON MOTION TO AMEND THE COURT'S  
MEMORANDUM OPINION

On February 23, 1982, this Court entered a Memorandum Opinion holding Claim 1 of each Patent-in-Suit valid and infringed. The Court further held that Claims 2 and 3 of each Patent-in-Suit are invalid.

[15] USM has filed a Motion to Amend the Memorandum Opinion. Specifically, USM requests (1)

reconsideration of the Court's holding that Claims 2 and 3 of each Patent-in-Suit are invalid, (2) reconsideration of the denial of USM's request for treble damages, and (3) the inclusion of an injunction as part of the Judgment.

In response, Detroit Plastic Molding Company's [DPM] reply indicated that it has neither an objection to amending the Opinion to hold Claims 2 and 3 of each Patent-in-Suit valid, nor to the issuance of an injunction as part of the Judgment, provided that the Court enters a stay thereof. However, DPM continues to oppose the award of treble damages.

Upon reconsideration, the Court agrees with the parties that, because Claim 1 of each Patent-in-Suit has been found valid, the dependant [sic] Claims 2 and 3 of each Patent-in-Suit should also be found valid. *Plastile Corp. v. Airlite Plastics Co.*, 390 F.Supp. 141 (D.Neb.1975); 35 U.S.C. §§ 112 and 282. Accordingly, USM's Motion in this regard is granted, and the Court now holds that Claims 2 and 3 of the Patents-in-Suit are valid. The Court further holds that these claims are infringed, for the reasons stated in the Memorandum Opinion, footnotes 42 and 43, pages 927 and 928, respectively.

Likewise, in light of the positions of the parties, the Court will (1) authorize an injunction as part of the Judgment, and (2) concurrently enter a stay thereof pending appeal.

However, the Court will not amend its prior decision on the issue of treble damages. Although the Court described the issue as "close" (Memorandum Opinion, p. 54), the fact that all patent claims have been upheld is not enough by itself to persuade the Court that DPM's infringement has been wilful and intentional.

Accordingly, USM's Motion in this regard is denied.

USM has submitted a Judgment in substantial conformity with the Court's holdings, as herein amended. It may be entered forthwith, together with a stay thereof.

*ON MOTION TO AMEND  
OR REOPEN THE RECORD*

Plaintiff filed a Complaint with this Court on December 9, 1976, in which it alleged infringement of two patents by Defendant. In its answer, Defendant denied infringement. It also filed a Counterclaim, which sought a declaratory judgment that the Patents-in-Suit are invalid. In a Memorandum Opinion, which was filed on February 24, 1982, the Court determined that (1) Defendant had infringed Claim 1 of the 989 Patent in connection with its contract to manufacture foam plastic glove box doors for General Motors Corporation, (2) Claims 2 and 3 of the 989 Patent and Claims 2 and 3 of the 686 Patent were invalid, (3) the balance of the claims of Plaintiff's Complaint and Defendant's Counterclaim should be dismissed, (4) neither party was entitled to attorney fees under 35 U.S.C. § 285, and (5) Plaintiff was not entitled to treble damages under 35 U.S.C. § 284.

[16] Defendant filed a Motion to Amend the Court's Memorandum Opinion or Alternatively to Reopen the Record to Admit New Evidence with the Court on March 18, 1982, in which it noted:

In its February 23rd Opinion, the Court addressed DPM's public use defense against U. S. Patent No. 3,801,686 (hereinafter called the "686 Patent") at Pages 22-25. On the record, DPM had relied on a letter by USM's patent attorney, Peter Tavernini, admitting prior public use (DX-G),



and Mr. McDougall's testimony comparing the application attached to Mr. Tavernini's letter with the application filed for the 686 Patent. At Pages 23-24, the Court balanced Mr. Tavernini's letter against Mr. Pollard's (another USM patent attorney) Amendment of June 14, 1973. In conclusion the Court said:

The Court finds that the language of both of these documents is so ambiguous that it is unable to draw any conclusions from them upon this issue [DPM's public use defense].

At Page 25, the Court stated:

The only other evidence on the issue of the prior disclosure of the 686 Patent was provided by Simmonds.

Defendant argues that the Court must have "lost sight of Mr. McDougall's testimony on point," and requests that the Court amend its Memorandum Opinion to "take account of Mr. McDougall's testimony and invalidate the 686 Patent for prior public use." Alternatively, Defendant asks that "the Court . . . reopen the record and admit DX-G-1 — a certified copy of Mr. Tavernini's letter with attached application."

Local Rule 17(j) provides, in part, that "[o]ral hearings on [motions such as that at bar] shall be permitted unless the Judge at any time prior to the hearing orders their submission and determination without oral hearing on the briefs filed as required by this Rule." The Court, being of the opinion that an oral argument would not facilitate a resolution of the issues which have been raised by Defendant's Motion, will dispense with oral argument on the instant Motion.

Local Rule 17(k) guides this Court in resolving Motions

to Amend a Judgment. The Rule provides, in pertinent part:

. . . motions for rehearing or reconsideration which merely present the same issues relied upon by the court, either expressly or by reasonable implication, will not be granted. The movant must not only demonstrate a palpable defect by which the Court and the parties have been misled but also show that a different disposition of the case must result from a correction thereof.

This Court believes that Defendant, in the pending Motion, has (1) raised the same issues which have been previously ruled upon by the court, and (2) neither demonstrated ". . . a palpable defect by which the Court and the parties have been misled . . ." nor provided any evidence which would suggest that a different disposition of the case must result from a correction of the Memorandum Opinion. Therefore, the Court will deny Defendant's Motion to Amend the Court's Memorandum Opinion or Alternatively to Reopen the Record to Admit New Evidence.

It Is So Ordered.

#### *STAY OF INJUNCTION*

On March 10, 1982, this Court entered a Judgment relating to the issue of liability. The Court believes that the application of the Injunction against further acts of infringement of Claims 1 through 3 of the Patents-in-Suit, as set forth in Paragraph 5 of the Judgment shall be, and is, stayed pending a final disposition of all timely appeal(s) from the Judgment.

It Is So Ordered.

#### *RE-ENTRY OF JUDGMENT*

The Court, having vacated its earlier Judgment of

March 10, 1982, and having filed an Opinion and Order Granting, in Part, and Denying, in part, USM's Motion to Amend the Court's Memorandum Opinion which contained its Findings of Fact and Conclusions of Law as required by Rule 52, hereby orders as follows:

1. The Court has jurisdiction over the subject matter, as well as the parties to this action.
2. Plaintiff, USM Corporation [USM], has title and standing to sue for infringement of United States Patents Nos. 3,776,989 and 3,801,686, which were issued on December 4, 1973 and April 2, 1974, respectively (the Patents-in-Suit).
3. Claims 1 through 3 of the Patents-in-Suit are valid and enforceable.
4. Defendant, Detroit Plastic Molding Company [DPM], has infringed Claims 1 through 3 of the Patents-in-Suit through the practice of processes for injection foam molding.
5. DPM, its officers, agents, servants and employees, and all persons in active concert or participation with them, are enjoined from further acts of infringement of Claims 1 through 3 of each of the Patents-in-Suit without license from USM.
6. All remaining Claims and Counterclaims which have been made by the parties are dismissed with prejudice.
7. Neither party is entitled to an award of attorneys fees. 35 U.S.C. § 285.
8. USM is not entitled to treble damages. 35 U.S.C. § 284.
9. USM, as the prevailing party in this action, is

entitled to recover its costs. *Fed.R.Civ.P.* 54(d) and 28 U.S.C. § 1920.

10. In the Joint Pretrial Order, the parties have stipulated that all issues relating to the amount of damages are to be severed and tried separately from the issues of liability. It Is So Ordered that an accounting to determine the amount of damages which are recoverable by USM shall take place immediately following the final disposition of any appeal(s) that may be taken from this Judgment.
11. Excepting the issue of damages (see Paragraph 10 above), this Judgment is final. 28 U.S.C. § 1292(a)(4).

#### FOOTNOTES TO THE MEMORANDUM OPINION

<sup>1</sup> Hendry's credibility was undermined when it was discovered that he had given false testimony concerning his education. He falsely claimed to have had a degree in engineering from Wayne State University. His credibility was further undermined when he persisted in giving false testimony on the subject even after the discrepancy had been brought to his attention.

There was no indication whatsoever that DPM or its counsel had any knowledge of, or participation in, this false testimony.

<sup>2</sup> Both parties also designated as evidence substantial parts of the extensive deposition taken in the case. Those designations will not be reviewed specifically, however, they will be referred to as necessary in this Opinion.

<sup>3</sup> The term "barrel" is interchangeable with the term "chamber," which is sometimes used in the Patents.

<sup>4</sup> Increasing the injection rate increases the temperature of the plastic as it enters the mold, as a result of shear friction.

<sup>5</sup> This process is more fully described in Part IIC of this Opinion, *infra*.

<sup>6</sup> The processes disclosed in the Patents-in-suit are more specifically discussed in Parts IIIC(4) through IIIC(10) of this Opinion, *infra*.

<sup>7</sup> Proposed Findings 84 and 86, pp. 27-28.

<sup>8</sup> In addition, DPM contends that the 989 Patent is prior art as against the 686 Patent. *Id.*, number 85, p. 27. The Court agrees, and so finds. Thus, in determining the validity of the 686 Patent, the Court will consider the 989 Patent.

<sup>9</sup> This statement is essentially a description of the Dow process which was disclosed in the Beyer Patent. *See* Part IIC of the Opinion, *infra*. Thus the Court will not give it any separate consideration.

<sup>10</sup> An extrusion process is essentially a continuous injection process without an enclosed mold. The Hansen article illustrates its teachings with an extrusion process for producing wire insulation.

<sup>11</sup> This analysis of the Hansen article was confirmed by both technical experts, Simmonds and Hendry.

<sup>12</sup> The flow resisting zone consists of those specific parts of the injection apparatus between the barrel of the injection machine and the mold, such as the nozzle, the sprue, the gates, and the runners.

<sup>13</sup> The only testimony concerning this Patent was provided by Dugald McDougall (McDougall), an experienced patent attorney in Chicago, Illinois. He testified that the application, upon which the Fred USM Patent is based, was a counterpart of USM's application serial number 644,886, dated June 9, 1967. DPM submitted no technical or other expert testimony concerning the disclosure of this Patent.

The Court finds that (a) the McDougall testimony by itself is not a sufficient basis upon which to make any finding concerning the disclosure of the French USM Patent, and (b) DPM has failed to prove its relevance to this action. Accordingly, the Court will make no further reference to it in this Opinion.

<sup>14</sup> *See also Eltra Corporation v. Basic Incorporated*, 599 F.2d 745, 750 (6th Cir. 1979), *cert. denied*, 444 U.S. 942, 100 S.Ct. 297, 62 L.Ed.2d 308 (1979), wherein the Court held that it was error to require the defendant to prove its case by "clear and convincing evidence" in the "typical case," "where the bulk of the evidence of the prior art is contained in documents." The Court noted that the higher standard of proof "may apply to the unusual case, such as where the evidence may be of an inherently unreliable nature [citation omitted] or where fraud is alleged." *Id.* at 750-51. This Court finds that the present case is "typical" rather than "unusual" for these purposes. Thus, DPM is only required to prove its validity defenses by a preponderance of the evidence.

<sup>15</sup> 35 U.S.C. § 120 in pertinent part, provides: "An application for patent for an invention disclosed in the manner provided by the first paragraph of section 112 of this title in an application previously filed in the United States, or as provided by Section 363 of this title, by the same inventor shall have the same effect, as to such invention, as though filed on the date of the prior application, if filed before the

patenting or abandonment of or termination of proceedings on the first application or on an application similarly entitled to the benefit of the filing date of the first application and if it contains or is amended to contain a specific reference to the earlier filed application."

<sup>16</sup> These requirements include the enablement, best mode, and particularly of description requirements. See 3 *Patents, Chisum*, § 13.02[3], at 13-10 to 13-11.

<sup>17</sup> Additionally, DPM contends that the Hansen article, although considered by the Patent Office, was not fully "appreciated." The Court finds that this contention lacks support in the evidence, and constitutes little more than a statement of its disagreement as to the pertinence of the article.

<sup>18</sup> See Part IID of this Opinion, *supra*, for a further discussion of the differences between the Patents-in-suit and the DuPont Report.

<sup>19</sup> See Part IIE and G of this Opinion, *supra*, for a further discussion of the differences between the Patents-in-suit and the Vinatex 191 Patent.

<sup>20</sup> DPM does not claim that any of its other prior art references anticipated the Patents-in-suit.

<sup>21</sup> See Part IIE of this Opinion, *supra* for a further discussion of the differences between the Patents-in-suit and the Vinatex 773 Patent.

<sup>22</sup> Transcript 2413-14. The Court notes that DPM does not rely upon any testimony from Hendry in support of this contention.

<sup>23</sup> DPM's Post-Trial Proposed Findings of Fact and Conclusion of Law, number 96, p. 30.

<sup>24</sup> See Part IIG of this Opinion, *supra*, for a further discussion of the differences between the Patents-in-suit and the Vinatex 191 Patent.

<sup>25</sup> See Part II of this Opinion, *supra*.

<sup>26</sup> This is fully evidenced by the DuPont article.

<sup>27</sup> As noted, USM contends that DPM infringes only Claims 1, 2, and 3 of its Patents. Thus these are the only claims at issue.

<sup>28</sup> This detail is provided both theoretically in the applicable formulae, and practically in several specific examples.

<sup>29</sup> Claim 6 of the 989 Patent states:

"6. The process for molding articles of foamed material as defined in claim 5 in which walls of said mold are at a temperature below the decomposition temperature of said blowing agent and portions of polymeric material against said walls are cooled to a temperature at which blowing agent in said portion remains undecomposed."



Claim 5 of the 989 Patent states:

"5. The process for molding articles of foamed material is defined in claim 1 in which said blowing agent is a chemical compound which is decomposed by heat to liberate gas expanding the polymeric material and in which the time and temperature to which the mixture of polymeric material and blowing agent has been subjected prior to being forced through a restricted cross section zone is at a level such that the additional heat generated in passing through said restricted cross section zone brings the blowing agent to a temperature at which it decomposes to generate its gas at a high rate."

<sup>30</sup> The Beyer Patent only discloses that the mold walls act to cool the mixture adjacent thereto to solidify it. The walls are not specifically cooled. It is not the purpose thereof to arrest decomposition since, in this process, decomposition has already taken place. Moreover, the Beyer Patent does not disclose how much cooling to employ.

The Dupont article discusses mold temperature, but only its effect on injection time. As noted, this article does not deal with a foam process at all.

The Vinatex 773 Patent also mentions "cooling at least a part of the mould surfaces," (Claim 1) and using hydraulic fluid or gas to cool the movable plate of the mold to a temperature of 0° to 80° C. (Claim 6). These disclosures are different in kind than those relating to cooling found in Claim 1 of the 686 Patent.

The Vinatex 191 Patent discloses to cool one or more of the mold surfaces no differently than Claim 1 of the Vinatex 773 Patent.

<sup>31</sup> Claim 10 of the Vinatex 191 Patent states:

"10. A method of moulding large microcellular articles from natural or synthetic polymers, which method comprises providing a mould, a proportion of the volume of whose mould cavity is occupied by one or more retractable cores of uniform cross-section; injecting sufficient of a polymer composition containing a blowing agent, from an injection cylinder in a core or cores through a nozzle or nozzles situated in the end of the core(s) into the mould, to form a skin on the surface of the mould; when the skin has sufficiently solidified, injecting more of the polymer composition and retracting the one or more cores from the mould cavity, provided that retraction of the one or more cores is started at the same time as, or before, the recommencement of injection; said polymer composition being injected into the mould cavity at a temperature at which it is plastic and at which the blowing agent will decompose."

<sup>32</sup> Claim 5 of the 989 Patent is quoted in note 29, *supra*.

<sup>33</sup> Transcript 4269.

<sup>34</sup> In its Post-Trial Brief, DPM also cites a portion of a deposition of Homer L. Claypoole (August 21, 1978, pp. 148-50). However, this portion was not designated as evidence by DPM at trial. Even if it had been designated, the Court would find that it suffers from the same difficulties as the Tuten testimony.

<sup>35</sup> Moreover, McDougall's position was controverted by Alphonse D'Amico, DPM's own patent counsel, who testified that he understood the Patents-in-suit.

<sup>36</sup> There was some evidence that the presence of "chemical activators" in certain plastics may lower the decomposition temperature of Celogan RA. However, there was no evidence that any such chemical activators are found in Dylark-250, which is the plastic resin used by DPM.

<sup>37</sup> These factual assumptions approximate the actual operating conditions in a standard DPM cycle.

<sup>38</sup> See Rule 801(d)(2), Federal Rules of Evidence. USM contends that the legal effect of these facts is that DPM is equitably estopped to deny infringement. The Court considers that this contention is both overstated and without merit.

<sup>39</sup> Another test showed that when the barrel temperature was raised or lowered, part quality became unacceptable. USM contends that this proves that DPM operates within the "temperature window" that is characteristic of its process, and therefore that DPM infringes. However, the Court is not persuaded by this test, since there was no evidence that the temperature window effect is not also characteristic of the Dow process.

<sup>40</sup> DPM contends that it did the necessary research work to adopt the Dow process to a copolymer. But the DPM employees, who did this work, were not called as witnesses.

<sup>41</sup> See e.g., DX AS.

<sup>42</sup> In the event that Claims 2 and 3 of the 989 Patent are subsequently found to be valid, the Court would also find that DPM infringes them as well. DPM uses an expandable mold, as disclosed in Claim 2 of the 989 Patent, and the temperature of its barrel is controlled by a heat transfer means, as disclosed in Claim 3 of the 989 Patent.

<sup>43</sup> In the event that Claims 2 and 3 of the 686 Patent are subsequently found to be valid, the Court would also find the DPM infringes them as well. Claim 2 of the 686 Patent restates Claim 1 of the 989 Patent, which this Court has already determined DPM infringes. Claim 3 of the 686 Patent discloses to use a chemical blowing agent that generates gas by thermal decomposition. Celogan RA, used by DPM, is such a chemical blowing agent.

**APPENDIX 2**

**ORDER**

**NOT RECOMMENDED FOR FULL-TEXT PUBLICATION**

*Sixth Circuit Rule 24 limits citation to specific situations. Please see Rule 24 before citing in a proceeding in a court in the Sixth Circuit. If cited, a copy must be served on other parties and the Court.*

*This notice is to be prominently displayed if this decision is reproduced.*

(United States Court of Appeals  
for the Sixth Circuit)

(Filed September 22, 1983)

(USM Corporation, Plaintiff-Appellee, Cross-Appellant,  
v. Detroit Plastic Molding Company, Defendant-  
Appellant, Cross-Appellee — 82-1339/82-1357)

Before: Keith, Martin and Wellford, Circuit Judges.

This is an appeal from the United States District Court for the Eastern District of Michigan which found that the appellant, Detroit Plastic Molding (DPM), had infringed a patent held by USM, Inc. A judgment was entered on March 10, 1982, but was vacated on March 12 because it was inconsistent with the court's findings. On April 19, the court entered an order on USM's motion: 1) amending its opinion to hold all four dependent claims of the patent valid; 2) authorizing entry of an injunction to be concurrently stayed pending appeal; and 3) again denying increased damages. This appeal followed. The plaintiff-appellee cross-appealed for treble damages and attorney's fees. For the reasons stated below, we affirm the decision of the district court.

The patents-in-suit (Patents 989 and 689 [sic, 686]) involve a foam plastic injection molding process. Pellets are loaded into a hopper, where they are melted in a barrel and injected into the mold. There the plastic pellets cool, solidifying into the shape of the mold.

The problem that has been encountered with this process is that if the plastic is too hot it will develop blisters, and if too cool, it will have sink marks. Beginning in 1960 substantial research was done in the area. It was determined that by adding a blowing agent, which decomposed into gas when heated, the plastic would be "foamed", thus preventing sink problems. Several processes were developed to take advantage of these findings, including the Dow Process.

DPM alleges that it uses the Dow Process. This process involves heating the mixture of plastic and blowing agent to the temperature where it would be expected to foam in the barre. However, pressure is applied throughout the injection machine and the mold to restrain foaming until after injection. The entire mold is filled, and the expansion of the decomposing blowing agent is accommodated by expanding the mold.

In the USM process, which was disclosed in the patents-in-suit, the mixture of plastic and blowing agent is not heated in the barrel to the temperature where the blowing agent decomposes. (This temperature is called the decomposition temperature, or the foaming temperature.) Rather, sufficient heat is added during injection by means of shear friction, so that foaming commences when the mixture is in the mold. While the mixture in the mold is still fluid, the mold is expanded to allow the gas, which was generated by the decomposing blowing agent, to expand. Thus, a foamed inner portion is created. However, through the use of cooled mold walls, foaming is arrested in the portion of the mixture adjacent to the walls so that it has a solid skin outer surface when the part cools.

DPM manufactures and supplies molded plastic parts to industry, and uses many processes, including both the conventional plastic and the foam plastic injection molding processes. From 1972 through 1975, it obtained

substantial information from both Dow and USM concerning their respective foam processes. In 1975, DPM contracted with the Chevrolet Division of General Motors Corporation (GM) to produce and supply glove box doors of foam construction. The present controversy arises from that contract. USM contends that DPM, in fulfilling the contract, uses and infringes the processes that have been described in the patents-in-suit. On the other hand, DPM contends that it uses the Dow process.

Our review of this case is limited by Fed.R.Civ.P. 52(a), which states in pertinent part: "Findings of fact shall not be set aside unless clearly erroneous . . . ". The appellant's first contention is that the district court erred procedurally and substantively in its handling of the Tavernini letter. (A letter sent by USM's patent counsel, Peter Tavernini, to the patent office requesting a license to file a patent in Japan.) We find this assertion to be meritless. Procedurally the appellant contends that the court erred in excluding the "enclosed specification" referred to in the Tavernini letter. However, we find no error in this action. The appellant had a two year period in which to offer this "enclosed specification" during pre-trial proceedings. However, it failed to do so. The delay in offering this specification was never totally explained to the Court.

Substantively, the appellant contends that the letter alone constitutes an admission that the subject matter of the 686 patent was barred from patent protection in the United States because of its prior disclosure. However, this contention cannot be substantiated.

First, the district court reviewed the Tavernini letter in conjunction with a second letter written by Mr. Pollard (another USM patent attorney). It found that both of these letters were too nebulous to reach a conclusion that the process had been publicly disclosed. The letters were

not specific about the process involved, and the specifications that were mentioned were not made a part of the record.

Secondly, Mr. Simmonds, who was one of the co-developers of the process, testified that process 686 had not been disclosed anywhere in the world prior to January 4, 1971. DPM submitted no evidence to controvert these facts, and the court properly found on the evidence that the patents were not invalid. Therefore, the findings of the district court were not clearly erroneous.

The appellant's second contention is that the infringement holdings based on the temperature settings are clearly erroneous. "Decision of infringement claims require a court to look at the heart of the invention. If it is appropriated, the patent is infringed." *Weidman Mutual Masters Co., v. Master Corporation*, 623 F.2d 1024, 1030 (5th Cir. 1980), *cert. denied*, 450 U.S. 982 (1981). The district court determined that the "heart of the invention" of the 989 patent was the specific disclosure to control the increment of heat added to the mixture during injection. By coordinating the dimensions of the flow resistance zone and the injection rate, the temperature of the mixture is raised from below to above the decomposition temperature of the blowing agent. USM argues that this is precisely the process that DPM follows in making the glove boxes for GM. However, DPM contends that it practices the process described in the Beyer patent (the Dow process).

The temperature of the mixture in the barrel is a central factor in this case. The Dow process, allegedly used by DPM, has the mixture temperature maintained above the decomposition temperature of the blowing



agent. In the USM process the temperature of the mixture is maintained below the decomposition temperature of the blowing agent. The district court found, based on the results of tests of the mixture by both parties, and expert testimony regarding the decomposition temperature of the blowing agent, that DPM's mixture temperature was below that of the decomposition temperature. Therefore, it found that DPM was infringing upon USM's process. The district court's findings are based on the evidence, and are not clearly erroneous.

The appellant raised numerous other issues on appeal. These included whether: 1) the 989 Patent was invalid under the obviousness test of 35 U.S.C. § 103 because the difference between that patent and the Venatex [*sic throughout, Vinatex*] 773 patent is within the level of ordinary skill; 2) the 989 patent was invalid because the Venatex 191 patent and the Venatex 192 patent were prior art; 3) the 686 patent was invalid under 35 U.S.C. § 102 for want of novelty or obviousness under 35 U.S.C. § 103 in light of the 989 patent; and 4) the court's adoption of Mr. Simmond's position on applicable temperature instrumentation was clearly erroneous. A patent shall be presumed valid, and the burden of proof is on the party asserting invalidity. 35 U.S.C. § 282. *Universal Electric Co. v. A. O. Smith Corporation*, 643 F.2d 1240, 1245 (6th Cir. 1981). The district court found that DPM failed to carry that burden. We have reviewed the record and find that the district court properly resolved this issue in finding that the patents were valid. The court also properly found that USM was not entitled to treble damages or attorney's fees.

Accordingly, we affirm the decision of the Honorable Julian A. Cook, Jr., United States District Court for the Eastern District of Michigan, which found that DPM had infringed the 989 and 689 [sic, 686] patent held by USM, and that all claims of the patent were valid.

Entered By Order Of The Court

/s/ John P. Hehman,  
Clerk

### APPENDIX 3

#### ORDER

(United States Court of Appeals  
for the Sixth Circuit)

(Filed January 6, 1984)

(USM Corporation, Plaintiff-Appellee, Cross-Appellant,  
vs Detroit Plastic Molding Company, Defendant-  
Appellant, Cross Appellee — Nos. 82-1357, 82-1339)

Upon consideration of the appellant/cross-appellee's  
petition for rehearing;

It is Ordered that the petition for rehearing be and  
hereby is denied.

Entered By Order Of The Court

/s/ John P. Hehman,  
Clerk